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Many Radio Experts Make $30, $50, $75 a Week

Radio broadcasting stations employ engineers, operators, station managers and pay up to $5,000 a year. Spare time Radio set servicing pays as much as $200 to $500 a year—full time jobs with Radio jobbers, manufacturers and dealers as much as $30, $50, $75 a week. Many Radio Experts operate their own full time or part time Radio sales and service businesses. Radio manufacturers and jobbers employ testers, inspectors, foremen, engineers, servicemen, paying up to $6,000 a year. Radio operators on ships get good pay and see the world besides. Automobile, police, aviation, commercial Radio, and loud speaker systems are newer fields offering good opportunities now and for the future. Television promises to open many good jobs soon. Men I have trained are holding good jobs in these branches of Radio. Read their statements. Mail the coupon.

There's a Real Future in Radio for Well Trained Men

Radio already gives jobs to more than 300,000 people. In 1935 over $300,000,000 worth of sets, tubes and parts were sold—an increase of 20% over 1934! Over 1,100,000 auto Radios were sold in 1935, 25% more than in 1934! 22,000,000 homes are today equipped with Radios, and every year millions of these sets go out of date and are replaced with newer models. Millions more need servicing, new tubes, repairs, etc. Broadcasting stations pay their employees (exclusive of artists) more than $23,000,000 a year! And Radio is a new industry, still growing fast! A few hundred $30, $50, $75-a-week jobs have grown to many thousands in less than 20 years.

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MODERN MECHANIX

MARCH
1937

Volume XVI
Number 5

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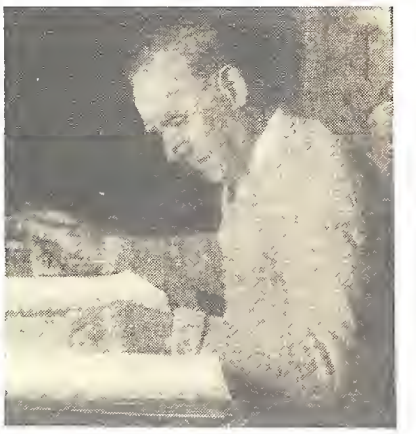

William McFee, famous sea writer, contributes a notable article on ocean mysteries to *Modern Mechanix* for April. The title is "Ships That Pass in the Night." He describes in a thrilling manner the fate of the Waratah, the Cyclops, the Joseph Medill and other famous vessels that have vanished into the unknown. He also gives his own expert explanation for the abandonment of the Marie Celeste, found in the Atlantic with sails set and all hands missing. You will want to read this unusual article by an expert on the subject. The author's books include "Casuals of the Sea," "Sailors of Fortune," "The Beachcomber," etc.

FOR WORKSHOP FANS

Among the many interesting projects included in the April issue will be A Gas Mask For Fumigating Purposes; the second installment of Building Midget Mike, an OO Gauge Locomotive; Cloud Hooker, a model endurance plane; and other workshop plans, suggestions, and time saving kinks.

Published monthly by Modern Mechanix Publishing Co., at Broadway and 11th St., Louisville, Ky., U. S. A. Entered as second-class matter under the act of March 3, 1879, at the post office in Louisville, Ky., with additional entry at Greenwich, Conn. Editorial offices, 22 West Putnam Ave., Greenwich, Conn. Address all manuscripts to Modern Mechanix, at the Greenwich, Conn., address. Not responsible for unsolicited manuscripts. Contributions accompanied by insufficient postage will not be returned. In U. S. and Possessions and in Canada, 15c a copy; $1.50 a year. Other Postal Unions, $2.00 a year. Printed in U. S. A. Advertising forms close the first of second month preceding date of issue. Advertising offices: New York, 1501 Broadway; Chicago, 360 N. Michigan Ave.; San Francisco, Simpson-Reilly, 1014 Russ Bldg.; Los Angeles, Simpson-Reilly, 536 S. Hill St. Member Audit Bureau of Circulations. **Editor**, Tom Mahoney; **Associate Editors**, Thomas A. Blanchard, John L. Scherer, Walker Matheson; **Hunting and Fishing Editor**, Robert Page Lincoln; **Naval Architect**, S. S. Rabl; **Art Director**, Al Allard.

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INVENTORS

TO BE successful as an inventor, you don't need to be an Edison who took out 1099 Patents before he died, or a C. F. Kettering, who helped develop the Self-Starter, Duco, Ethyl Gas, and other outstanding inventions, and is today the famous head of the Research Division of the General Motors Corporation. In fact, you don't need to be known as an inventor at all, if you have a practical, useful, salable invention—or an idea for one—**and go about it right.**

Remember that for every Edison or Kettering, for every McCormick, DeForest or Atwater Kent—there have been thousands of unknown men whose inventions helped along the wheels of progress and helped the inventors financially at the same time.

Many Little Ideas Have Big Commercial Possibilities

For example, who knows the name of the inventor of the wooden golf tee, the ordinary crinkly hair pin, or the metal ball or disc that the average housewife uses for scouring pots and pans? Who knows the inventor of the thousands of gadgets that you will find in the ten-cent stores, in the modern drug and department stores? Some day, stop and look at some of the simple articles you'll find on the counters of a ten-cent store. Notice how many of them are marked Patented or Patent Applied For. It is an interesting, educational experiment. These inventors, most of them, weren't of the genius class. They simply got an idea for doing something in a better, easier, faster, or more economical way—AND THEN DID SOMETHING ABOUT IT.

Interesting Points

Who is today's "champion inventor"?

Ans.: John F. O'Connor, of Chicago, Ill., holds 949 Patents, more than any other living man.

Who is "Lady Edison"?

Ans.: Miss Beulah Louise Henry of New York City leads all women inventors, holds fifty patents; is known as "Lady Edison".

What is an improvement?

Ans.: Nearly all inventions today are improvements over earlier inventions. Often the improvement proves more profitable than the earlier invention.

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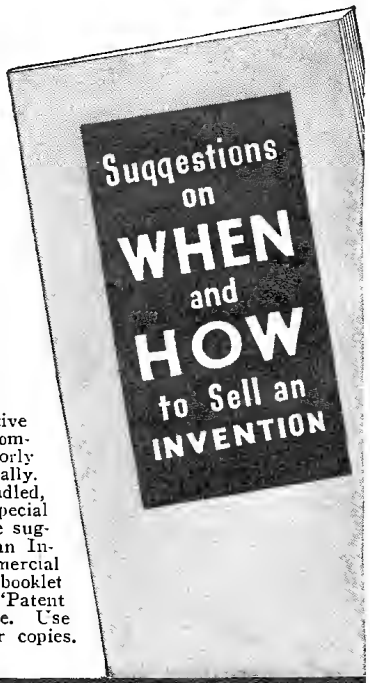

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NOTE ★ ★

You may not be an Edison or a Kettering but still you may have a good idea

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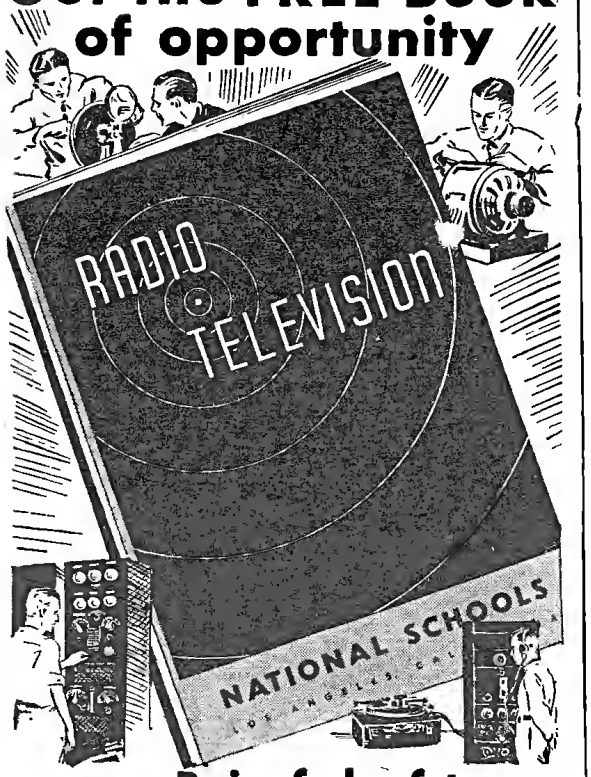

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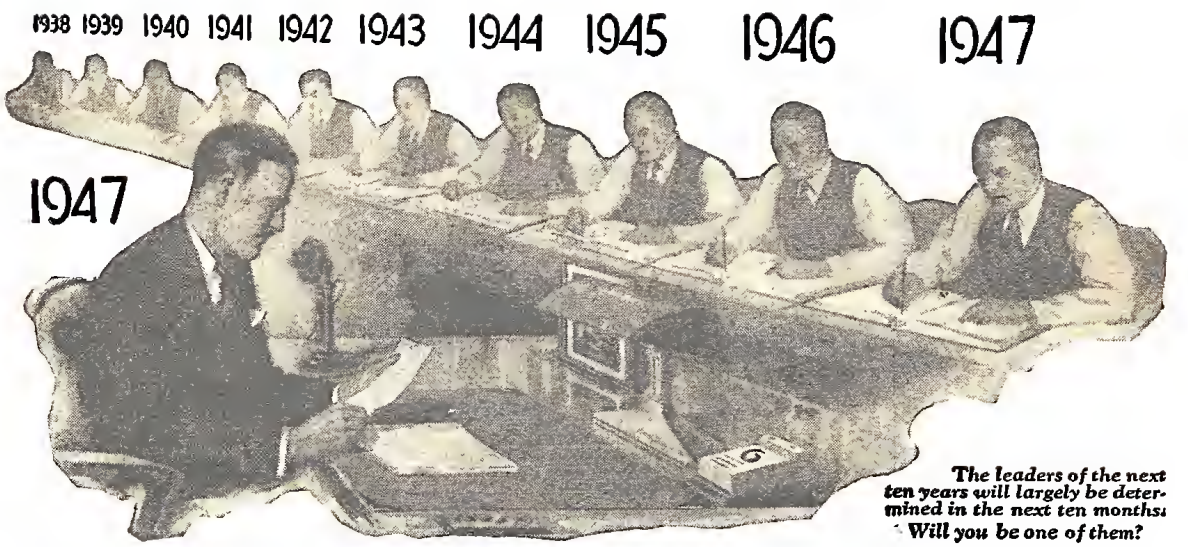

The leaders of the next ten years will largely be determined in the next ten months. Will you be one of them?

Will You Be Clerk or Manager Ten Years from Now?

"SURELY, this could never happen to *me*," you say—"that I should be sitting at the same desk—be doing the same work—*for ten straight years!*"

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HOW OTHER INVENTORS GOT STARTED

The list of men who succeeded in invention with only a poor boy's start is a very long and noble one. Poverty, hardships, lack of friends, distance from the market—these could not hold back Bell, Edison, Eastman, McCormick, Whitney and others. Everyone cannot succeed. But every man can try. Courage, sacrifice, and hard work may bring you a measure of the success these men had. Lack of mechanical ability is not a serious drawback. You can always get someone able to build a model, draw a detailed design, or otherwise materialize your invention for you. The big draw-back is discouragement.

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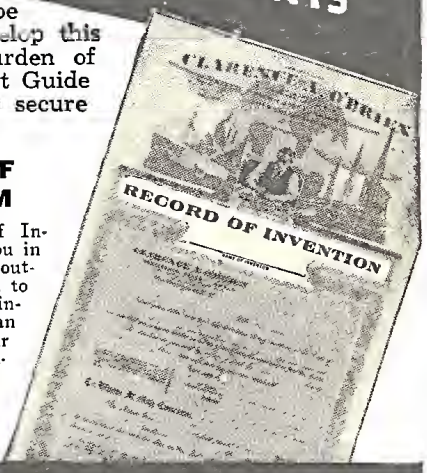

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EDITORS ANSWER READERS QUERIES

A DOUBLE FILAMENT LIGHT BULB

I have conceived an electric light bulb fitted with double filaments so that by snapping a switch a bright or dim light can be obtained. Do you think that this invention is worthy of a patent?—Orville Mesler, Andover, N. Y.

The double filament bulb is not new; in fact this particular type of electric bulb is already on the market. A large bulb fitted with a special base having three contacts instead of the usual two is used in all of the de luxe types of home indirect-lighting lamps.

BUILDING A TELEVISION RECEIVER

I would like to know if an ordinary radio receiver can be fitted with a neon bulb and used as a television receiver. Also, can a simple transmitter be arranged so as to transmit television images?—Clemens Lewicki, Bay City, Mich.

An ordinary radio receiver cannot be used for television reception nor can you use an ordinary transmitter for broadcasting television pictures. A television receiver suitable for modern television broadcast reception requires an elaborate resistance-coupled circuit and a cathode ray tube for projecting the image on the mirror screen.

A television transmitter is even more complicated than the receiver and to build a practical device would require an investment of $1,000 or more. We are afraid that you will have to give up your adapter television unit for radio sets.

"STEAM TRAP" FOR AUTO HEATER USE

Can you suggest a steam boiler which might be attached to the exhaust pipe of my car to be used for heating the water feeding into the car's hot water heater? To me this system seems practical, but first I would like to get your advice.—Floyd Bromfield, Conneaut, Ohio.

If it were possible to coil the exhaust pipe of your car in the same manner as home hot water heaters your suggestion might prove practical, but due to motor difficulties which might arise and the trouble involved in constructing this device is not worth the gamble. The universal method used in connecting modern car heaters is to fit the intake and output water hoses with thermostats which route the water from the car motor's cooling system through the car heater until a certain temperature is reached, after which the thermostats close and the regular radiator cooling system goes into operation. Sensitive thermostats insure the car heater's operating at maximum efficiency. This system, as you can see, is not only simple, but practical as well. To install a gadget on the exhaust pipe would just be a waste of time.

GASOLINE ENGINE DEVELOPS CARBON

The gasoline engine which operates our home lighting plant becomes so badly pitted with carbon deposites that it is necessary to grind the valves every few weeks. After repairing the engine it operates satisfactorily for about a week and then begins to lose compression. I have had the best motor mechanic in this locality examine the engine and he claimed the fuel I was using caused the trouble. Can you offer any suggestions that might prove helpful?—E. J. Miller, Hawells, Neb.

If your gasoline engine develops an excessive amount of carbon the trouble is due to the fuel. You are evidently using the wrong kind of gasoline. A gas engine should not be fueled with a high test mixture, but with a good grade of straight gas. High test gas was developed only for motor cars and when used in small one-cylinder engines often results in poor operation. To correct your trouble we would advise a graphite compound mixed with any good grade of white gasoline. This should reduce carbon and leaking valves to a minimum.

ANTI-FREEZE COMPOUND FOR STANDPIPE

We have a large tank on the roof of our building that cools the water in the air conditioning system we are using. Since this tank is exposed to sub-zero temperatures I am afraid that it is apt to freeze. Can you suggest a chemical compound that could be mixed with the water so as to prevent its freezing?—Leland T. Joahnson, Portland, Me.

You can prevent the freezing of water in your air conditioner plant by mixing 75 parts of carbonate potash and 50 parts of glycerine with each 100 parts of water placed in the tank. This mixture will prevent freezing down to 20 degrees below zero. This mixture while satisfactory for use in tanks should not be used in automobiles.

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PROBLEMS EDITOR, MODERN MECHANIX, GREENWICH, CONN.

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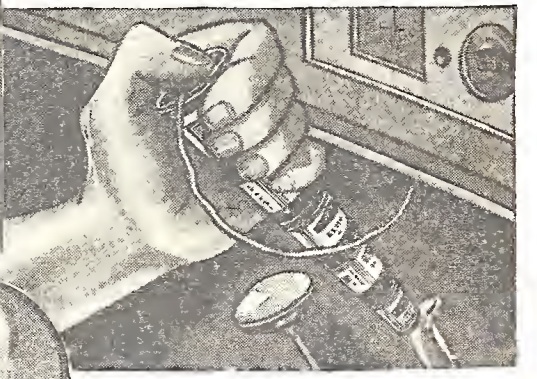
Battery Goes Dead in Desert! But Long Island Boy Drives On Without It



'We had just hit the desert country when the generator gave out...and then, surrounded by empty miles of sand and sagebrush and cactus, the battery went dead and the motor died," writes Ben Feinstein of Blue Point, Long Island.

"There we were, no one to help us, and night coming. My partner got out the flashlights in case we might need them, and I had a wild idea.

"I took the five cells out of my long-range 'Eveready' flashlight, taped them together in series, held a wire from the ignition switch firmly against the positive pole of the top cell, grounded the bottom cell on the emergency brake handle. My companion cranked the motor and she caught ...and those five DATED 'Eveready' batteries took us over thirty miles of desert that night.*

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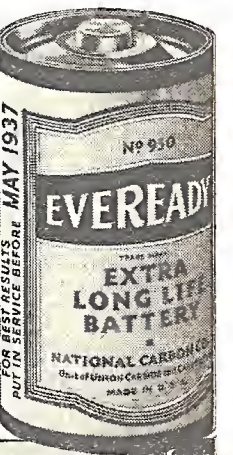

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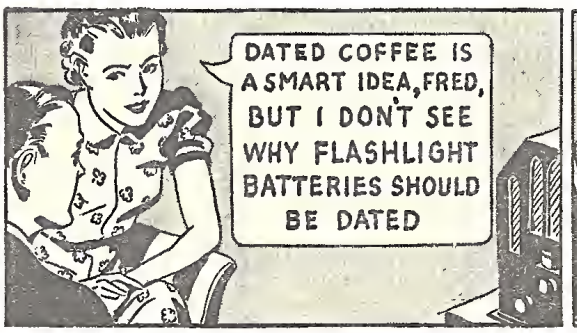

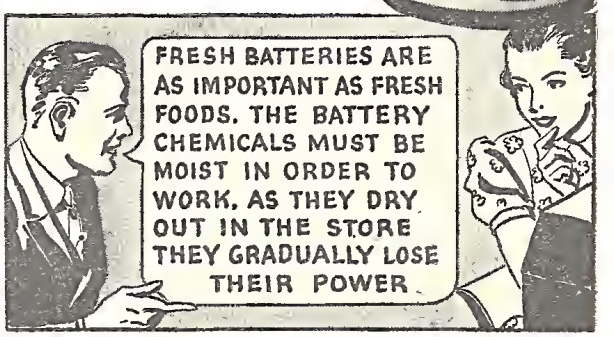
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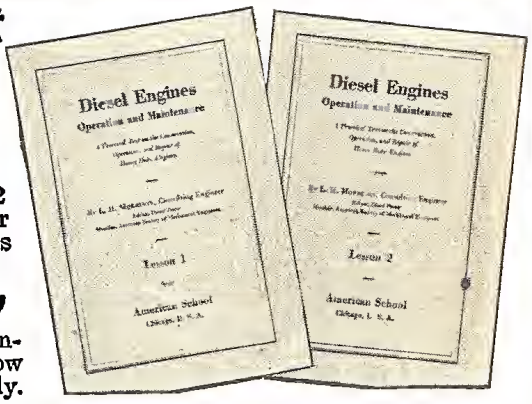

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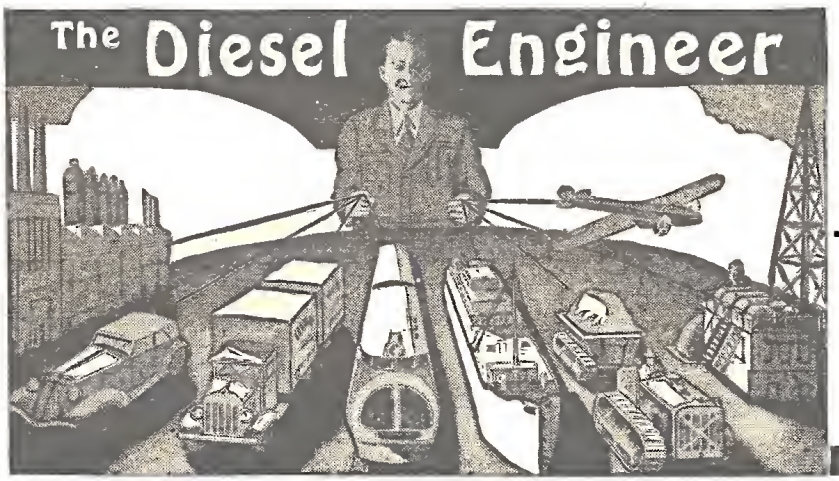

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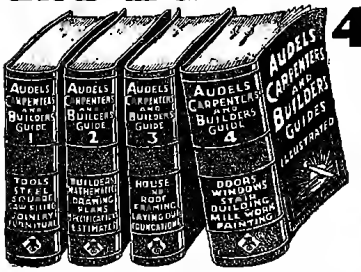

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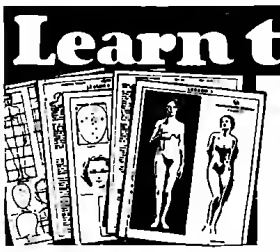

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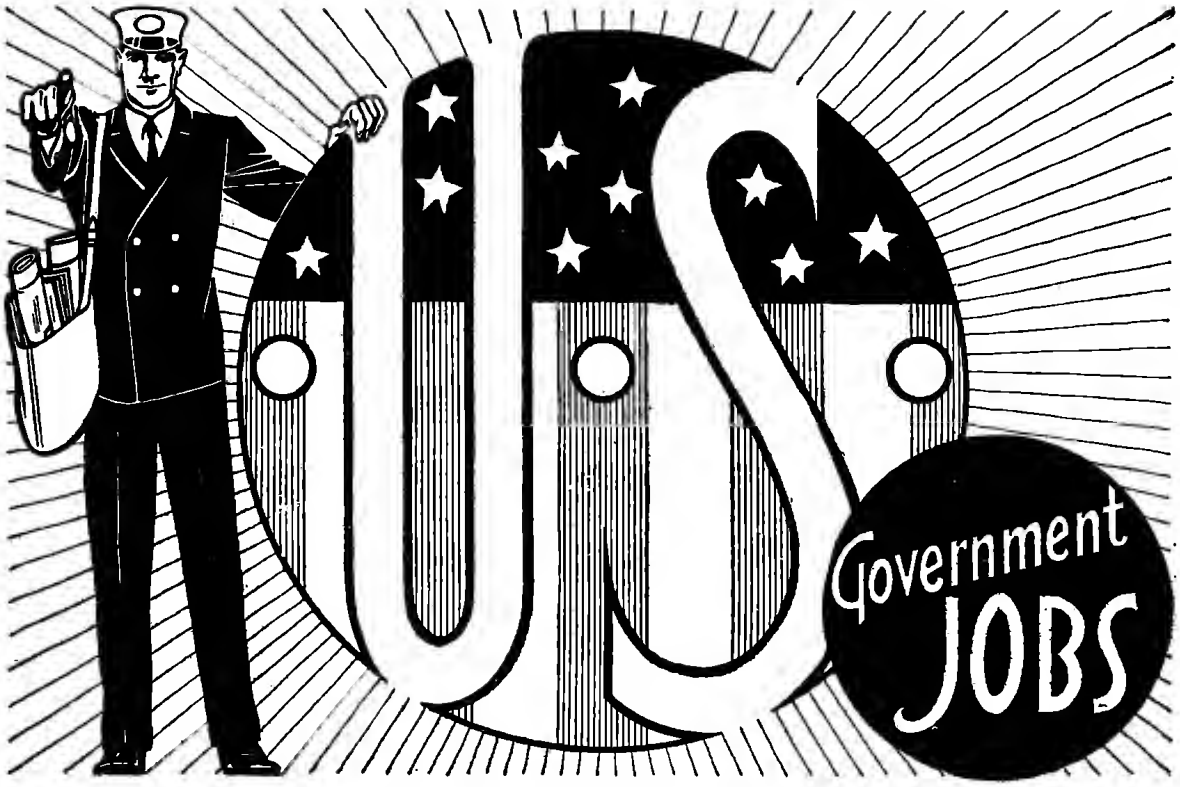

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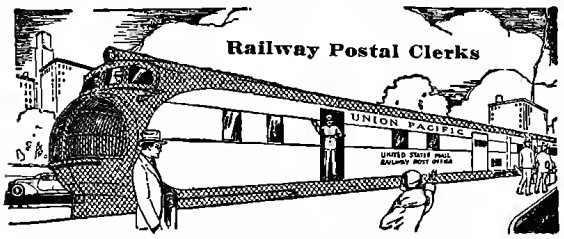

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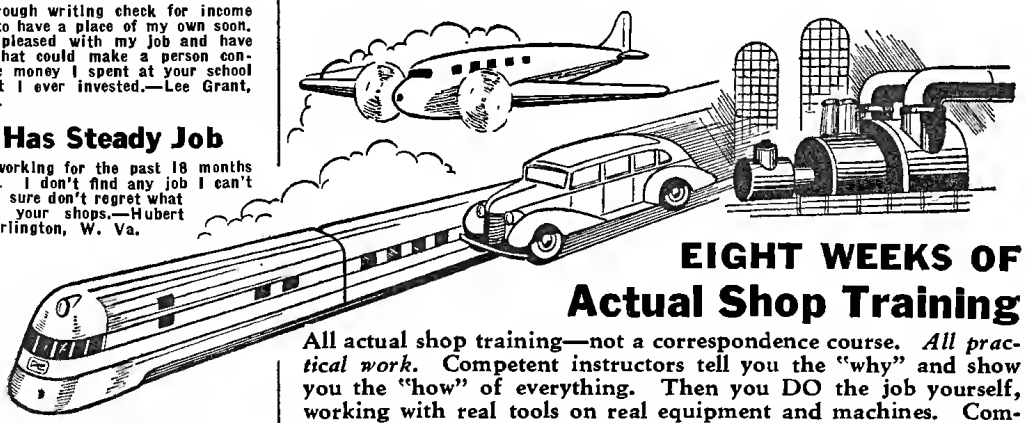

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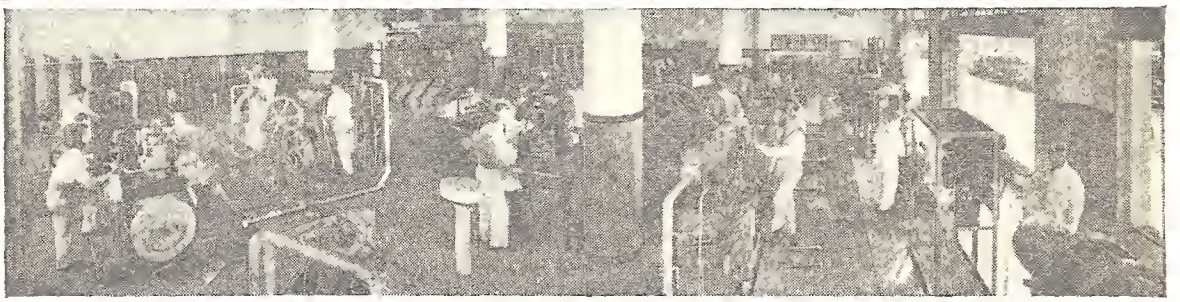

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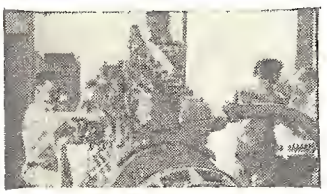

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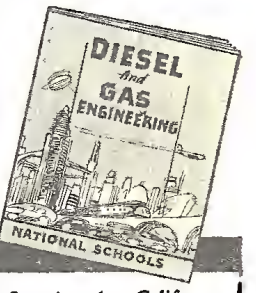

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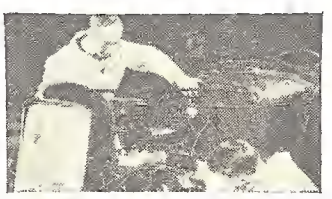

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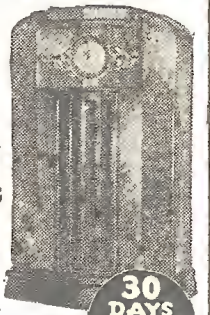

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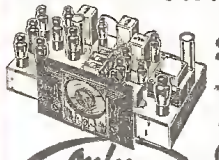

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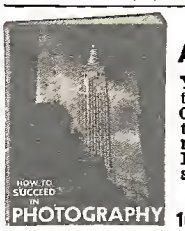

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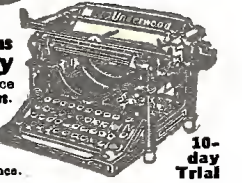

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Random Chips from

Using strap and angle iron salvaged from an old wind mill, Howard Puterbaugh, of Toledo, Ohio, constructed this practical scooter. It is powered with a ¾-horsepower engine.

IN GOING through the mailbag this month, we found several letters, in addition to those presented here, containing photos of interesting projects completed by MM workshop fans. To our dismay, the photos were mutilated to an extent that precluded their use in the Workbench. Photos were folded, torn, or marred by paper clips. Others, while good enough to distinguish by the human eye, were not distinct enough to be reproduced for publication.

The editor regrets that these photographs could not be considered for awards in the monthly Workbench contest, and to prevent similar trouble arising in the future the following suggestions are offered:

1. Do not fold photographs. Mark the envelope containing photos—"Photos. Do Not Fold."
2. Send clear photos that show up the project well. Focus your camera properly. Have plenty of light.
3. If paper clips are used, place a piece of thin cardboard between the clip and the photos to prevent marring.

***

One of the features of the letters received during the past few months is the willingness of the contributors to answer letters from other MM readers who might be interested in their projects as reported in the Editor's Workbench. This is commendable and should result in an exchange of correspondence between many MM workshop fans. Be sure and enclose a stamped, return envelope when writing contributors for information.

***

The March first prize of $5 cash was awarded to Howard Puterbaugh, of 443 Sunset Blvd., Toledo, Ohio, for a photo of his home-built pop-cycle. He writes:

Dear Editor:

Enclosed is a photo of my pop-cycle, a home-built project. The cycle, made during spare time, cost about fifty dollars.

Powered with a ¾-horsepower motor using a motorcycle transmission, chains and sprockets, the cycle travels 20 m.p.h. and averages 20 miles per quart of gasoline.

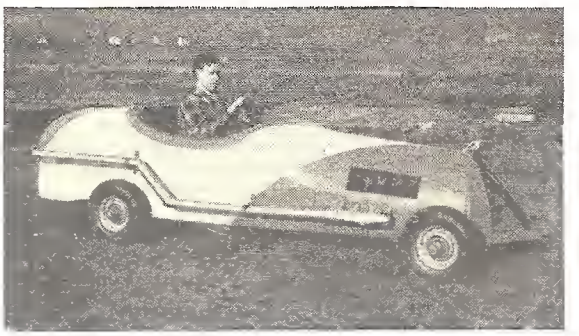
I have read MM for years and enjoy the Editor's Workbench particularly because it shows projects that can be built in the ordinary home workshop. I shall be glad to answer letters from MM readers who might be interested in my pop-cycle scooter.

Howard Puterbaugh.

Puterbaugh's project is one that should interest every reader who would like to build a small powered scooter. He is to be complimented for his ingenuity in constructing it.

***

Midget autos have not lost popularity with MM workshop fans and a $3 prize was awarded to Layton D. Bailey, of Painted Post, N. Y., for his photo and letter which says:



Ready to tear along the speedway is this midget racer built by Layton D. Bailey, of Painted Post, N. Y. Traveling 35 miles on a gallon of gas, the tiny car cost only $143 to build.

the Editor's Workbench

Dear Editor:

Enclosed is a photo of a midget two-place racer that I designed and built in my spare time. It is powered with a motorcycle engine and travels about 35 miles per gallon of gasoline.

The racer weighs 830 pounds and has a wheelbase of 76 inches with a tread of 42 inches. It travels 50 miles per hour, but I hope to get 75 out of her by a change in gearing. Total cost was about $143 for parts and materials. I will be glad to answer inquiries from MM readers.

Layton D. Bailey.

It is no wonder that midget autos continue to be a favorite workshop project when such trim looking racers as Bailey's can be turned out so cheaply.

***

Boat projects, always a prime favorite with MM readers, resulted in many interesting letters and photos being received. A prize of $3 cash was sent to F. C. Meacham, of Garden City, N. Y., who wrote as follows:

Dear Editor:

I wish to compliment you on your magazine in general, as well as your "How To Build 20 Boats" book. I had one of the first copies printed and built your boat "All-Sorts" which has attracted much attention in Hempstead Harbor, L. I., where I sail it.

I am enclosing a photo of the craft with myself at the helm. The sail has 72 square feet of area and was made from a larger sail that was 45 years old. I have plenty of fun when the breeze is fresh.

F. C. Meacham.

A glance at the photo of the trim sailing craft built by Meacham is all that is needed to convince one that many pleasant hours await the builder of a similar craft. Get those boat plans now, readers.

Hours of pleasant sailing have been the reward for constructing this "All-Sorts" boat from MM boat book plans. F. C. Meacham, of Garden City, N. Y., is the proud builder.

Warren Mathews, of South Bound Brook, N. J., built this powered sled and equipped it with runners for use on ice. He seeks advice from MM readers for converting to snow use.

***

With the winter season at its height, it was not surprising to receive an abundance of photos and letters concerning powered sled projects. A winner of a $3 prize was Warren Mathews, of 420 Cedar St., South Bound Brook, N. J., whose letter reads:

Dear Editor:

Here is a photo of my powered sled. It is 8 feet long and has a 7-foot runner plank. Main body frames are of 2x4 oak, steam bent to shape. The body is covered with chicken coop wire and auto top material, and the motor is an old motorcycle engine of 63 cubic inch displacement.

I can't say much about performance because we had too much snow, but I hope to make a pair of skiis so that it can travel over snow as well as on ice. I would appreciate advice from MM readers who have had experience with skiis on powered sleds.

Warren Mathews.

Mathews' sled is speedy looking and we hope that some MM reader will be able to supply him with some practical advice on the use of skiis.

***

From Midland, Mich., came a letter that won an award of $3. Sent in by Curt Armstrong, it

[*Continued on page* 28]

If it does, do something about it! Get a raise in salary—but first get the training that will entitle you to this raise. Thousands of men in the same fix as you have gotten this training by spare-time study of an I. C. S. Course. Mail the coupon today!

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City.....*State*.....

Present Position.....

If you reside in Canada, send this coupon to the International Correspondence Schools Canadian, Limited, Montreal, Canada

Editor's Workbench Chips

[*Continued from page 27*]

Proud builders are Curt Armstrong and Art Powrarky of Midland, Mich., who constructed this trim powered sled. It is powered by a small engine and features a belt driven propeller.

also contained a photo of a well designed powered sled. Here is what he had to say:

Dear Editor:

Enclosed please find a photo of the sled that Art Powrarky and myself have constructed. It has an engine with a 61 cubic inch displacement and has given very economical performance.

We are going to use a larger engine and add some other improvements soon. Hope you can use the photo.

Curt Armstrong.

We can always use clear photos of interesting projects, so if you have any on hand, send them along. Perhaps you, too, will be awarded one of the monthly cash prizes.

***

Good news to thousands of workshop fans who are interested in trailers is the announcement of the new MM book—"How To Build Trailers." You can secure a copy at your news-stand or by ordering direct from MM at Greenwich, Conn. The price for this fully illustrated book is only 50c per copy. Order your copy NOW so you can start work on one of the many practical trailers featured in time to complete it for the coming touring season.

***

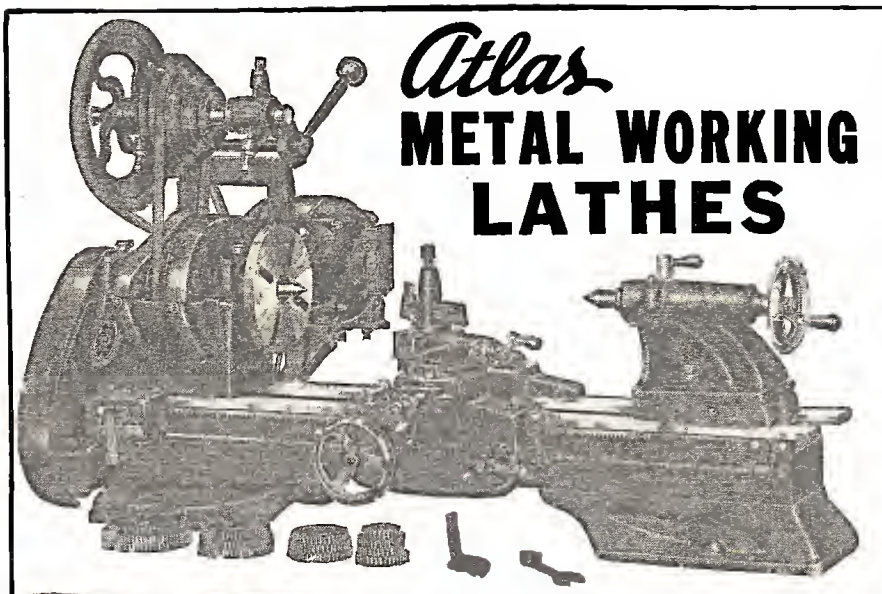
From George Lee, of 909 Lincoln St., Greensboro, N. C., comes a letter that may interest some MM readers. He writes:

Dear Editor:

Would appreciate it if you will send the name of any junior chemistry club that wants more members. Thank you.

George Lee.

If you are a member of a chemistry club seeking applicants, contact Lee and advise him as to requirements for membership.



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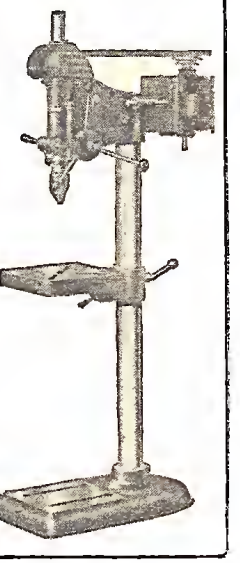

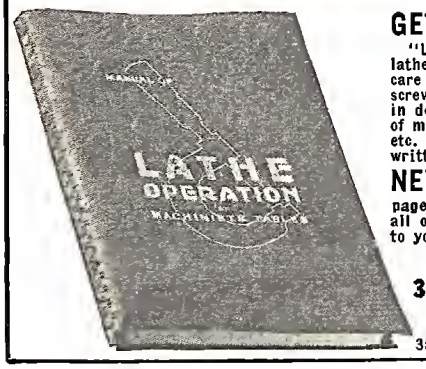

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EASY TERMS

The complete equipment is inexpensive. A reasonable down payment brings everything to you and the balance is paid monthly. From the start, you have your own business — one that is profitable and of which you can be proud.

MAIL COUPON *Today*

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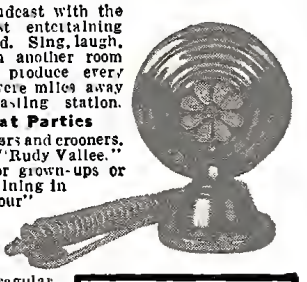

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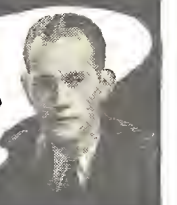

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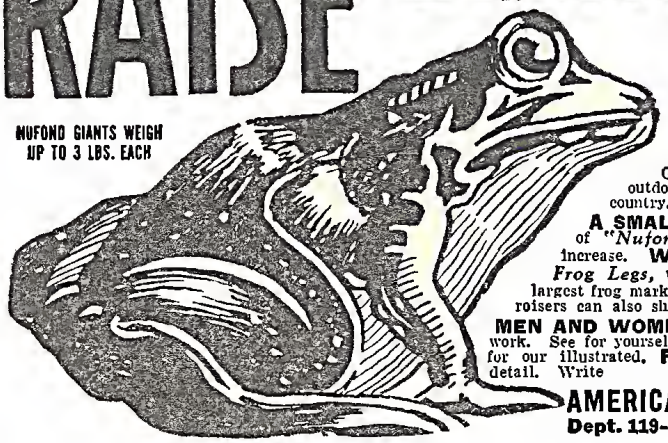

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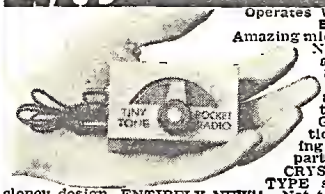

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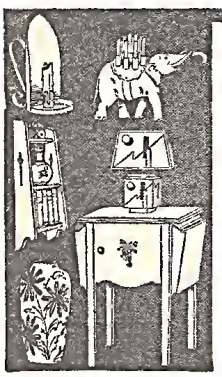

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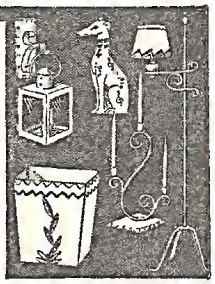

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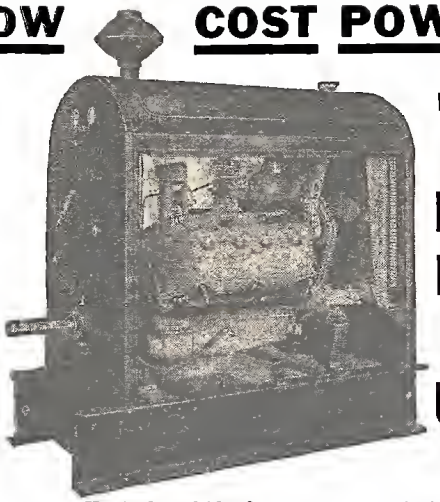

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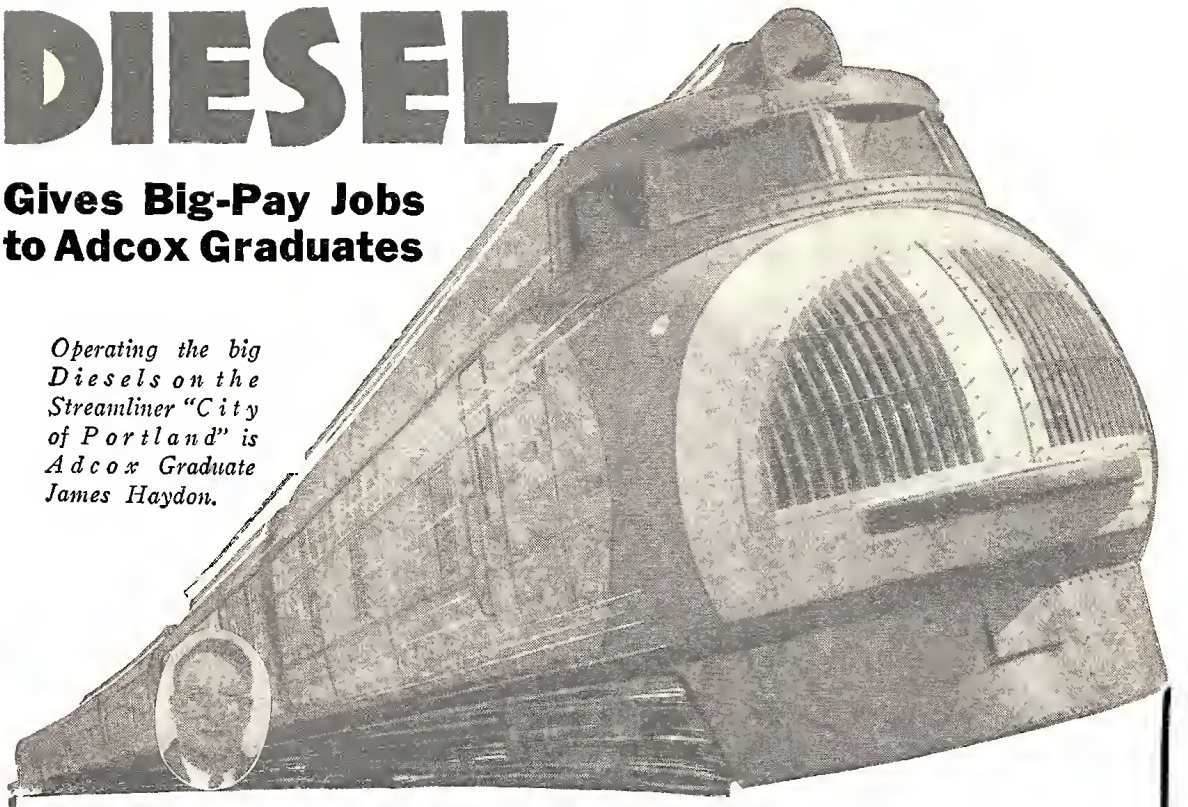

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HOBBIES ARE IMPORTANT

A Guest Editorial

H. D. Bennett

NO MANUFACTURER today can fail to realize the first-grade importance of hobbies—especially hobbies of a scientific nature. Many of the most practical benefits which we enjoy have come to us through someone's successful pursuit of a beloved hobby.

Hobbies reveal what we really like best to do. But it is wrong to assume that they are always different from one's actual vocation. When our company held the first industrial hobby show, and packed more people into the Toledo Museum of Art than had previously visited any exhibition there, it developed that the skilled workers follow their jobs as hobbies. That is, the tool-makers spend their evenings making new precision tools, the engravers devote their spare time to engraving, and the carpenters make hobbies out of building furniture.

In at least one of these cases, the hobby has resulted in a development which has brought new success both to the individual and to the company. It was this kind of incident which resulted in the discovery of the power of steam, the creation of the electric light bulb, and countless inventions. It does not matter what hobby one pursues, so long as one pursues it intelligently and thoroughly.

The trend in modern schools to build "Hobby Halls," which are actually practical science buildings and laboratories, is an excellent one. This is a scientific day and a scientific country, and hobbies of this nature are correct expressions of our people.

H. D. Bennett
President
Toledo Scale Company

MM HOME

Architect Bassall and, above, a view eastward of the foundation of the home on East View Ave., in Leonia, N. J. Beautiful rolling greens of the Englewood Golf and Country Club are in the background. Home photos by James Henry O'Brian.

by Wesley Sherwood Bessell

Noted New York Architect

THE last nails are being pounded in and the Modern Mechanix Model Home in Leonia, New Jersey, across the George Washington Bridge from New York City, will soon be finished.

The stucco and frame house, known as Tom's home in these articles, built for $3,500 with the aid of a Federal Housing Administration loan, is ready for occupancy. This spring, Mary will begin her gardening immediately after the workmen complete the landscaping. And Mary will have a hand in supervising that, too!

Tom was able to secure a more advantageous loan to finance his home than he expected. The bank pointed out that he could secure an FHA loan of $3,200, bearing interest at 5 per cent and payable over 20 years. In addition to such installments, the mortgage loan provides for monthly payments on the mortgage insurance charges, taxes, fire and other hazards, bringing the amount of the total monthly payments, including one-half per cent per year service charge on outstanding balances, to $40.08.

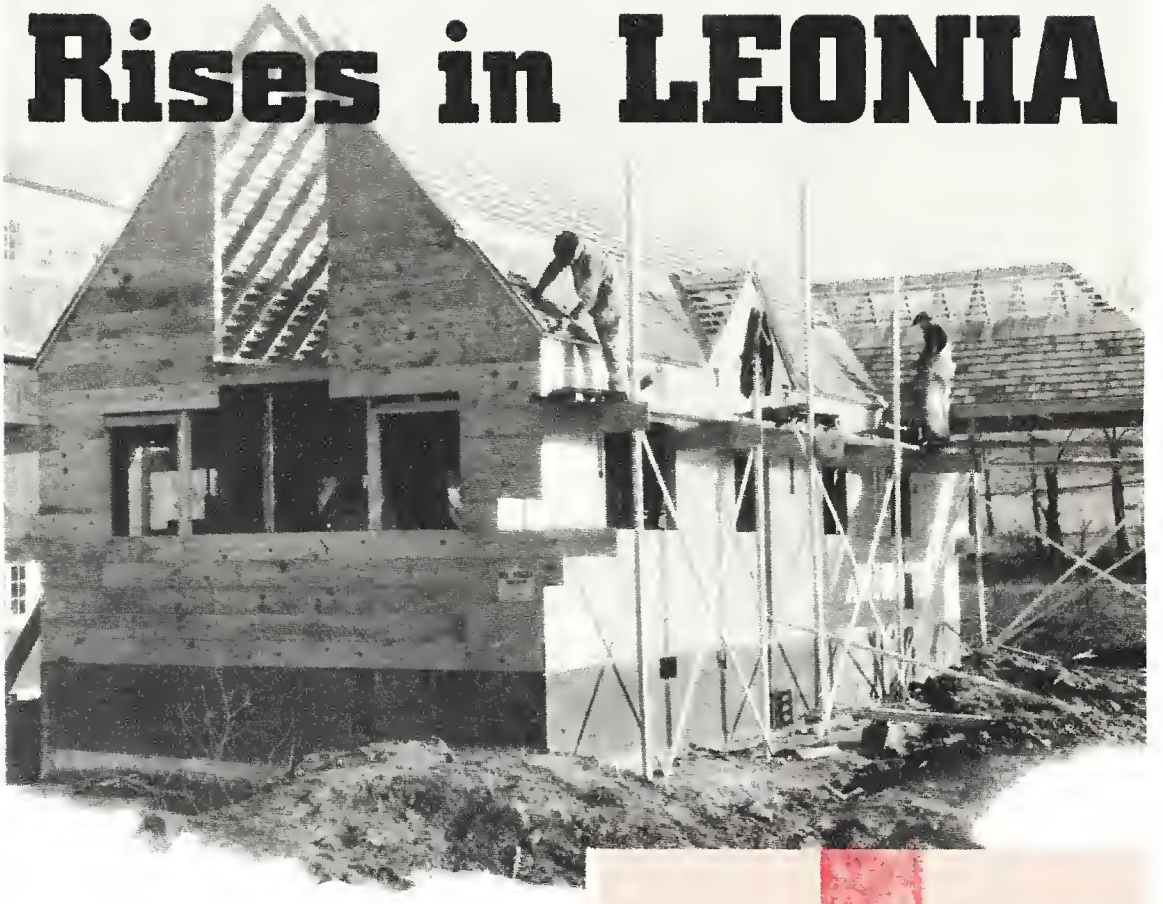
This leaves Tom ample funds in the bank from his original $1,600 savings, as his new loan now includes construction of walks, grading and the architect's fee besides the building of the house itself.

As Tom already owns the land—which he bought for $600—and only had to have a required 20 per cent equity in the house itself, his cash outlay on the building became small.

Work on the model home was actually started on October 19, 1936. This was five days after the contract had been drawn and signed by MODERN MECHANIX magazine and the Vonovich Construction Company.

The Vonovich company has been doing a large amount of small house building in

Rises in LEONIA



A view of the house from another angle. Workmen are shingling the south side of the roof in the winter sunlight. The structure has advantages for both winter and summer.

Leonia and vicinity, and its contract price for the model home was $3,500, exclusive of grading and walks.

Excavation work disclosed the fact that below a level of 4 feet 10 inches that part of the building near a brook would be in water, and the cellar level was then raised to overcome the possible menace of a damp basement. The footings were made of concrete, and the cellar walls of ten inches wide cinder block laid up in cement mortar. All this work has been inspected by A. W. Gill, local Building Inspector, his assistant, Mr. Pratt, and the writer.

Earth from the excavation has been set aside for grading, which will be done this spring. At the same time, sewer connections with the street main have been completed: this line, and also the water supply from the water main, will be carried over the brook and hidden by a simple wooden bridge to be finished later.

As the contract with the Vonovich Con-

This photograph shows the chimney for the open fire-place in the process of construction. This will be one of the notable interior features.

Framework of the home, looking north, is shown in the upper photograph. At side, framing and siding complete; chimney not yet in place. A view looking east.

struction Company specified that the work was to be completed by or before February 1, 1937, no time was lost. The contractor placed orders for his material to be delivered to the site at once. Therefore, as soon as the foundation work was completed, and the mortar set up sufficiently to permit any loads being placed upon it, the first floor timbers were cut to size and set in place on top of the sill.

Then quickly followed the exterior frame work, which was completed on November 17. The 4x4-inch attic beam or, as it happened in this instance, the exposed first floor ceiling beams, then were set, as well as the 8x10 summer beam, which is of yellow pine, and crosses the living room at the center. The smaller ceiling beams were placed two feet on center and are painted with a cold water paint in a white finish, as are the ceiling boards which form the attic floor.

After the beams were in place the roof rafters were set. In setting the rafters a carpenter first makes a template, or guide, simply by laying a rafter on the ground after ascertaining the proper height and the actual width at the heel, or bottom, of the rafter where it rests on the top of the wall. All rafters necessary to properly frame the roof are cut from the template and they are raised into place, each fastened at the heel to the rafter plate and at the ridge to the ridge beam. The rafters were in place about November 27, and then the contractor put a number of carpenters on the job who covered all the upside walls of the exterior frame work with shiplapped sheathing. Around all door openings and window openings the con-

A sketch of the kitchen arrangements is shown above. Tom Vonovich, builder, points out a detail to Ben Venezia, the electrical contractor, during installation of wiring for the house.

tractor has doubled all 2x4 studs, giving stability at all openings. This also was done over the door and window heads, making these openings rigid to prevent plaster cracks.

On December 1 the shingle roof was started and completed a week later. The shingles are red cedar, exposed five and one-half inches to weather. They are laid on shingle lath that had previously been fastened to the rafters. All flashing is of 16-ounce copper.

Directly after the roof shingles were on, the electrician and the plumbing and heating contractor started their rough work, and by December 24 the roughing was completed. Of course, the interior stud partitions were up and in place, so that when the mechanics were finished the lathers began work.

It must be understood that this house has not been built with any cheap material or expediencies. It is the intent to make a workmanlike job complete in all respects, and more or less along the lines or readily obtainable market products in any location. There are several grades of most all materials and numerous cheap substitutes. However, it is well to investigate the life and durability of such material before using them, or the owner may find himself faced with expensive maintainance and upkeep. All the work on this house has been open to public inspection and the entire construction, from start to finish, has been carefully inspected by the Building Inspector and the writer.

After the lathing was completed and plasterer followed during the early part of January, and heat was maintained by the use of salamanders. Two days saw the rough plaster finished, and two days later after the rough plaster was fairly dry, the white coat work was completed.

There being no ceilings to do, it was simple for the plasterers as they did not have to use planking to do the side walls. Planks are necessary for ceiling work, and are cumbersome to move about.

Since this work was begun, prices of materials have risen steadily. Even during the lapsed time from the start of the plans until the final contracts were signed, there was a steady advance in prices, and this made it necessary to make certain modifications in the plans to meet new costs. Therefore, it is possible that the spring prices will develop the fact that the cost of duplicating this house will be a little more than the price obtained by the MODERN MECHANIX, and for which the house is now being built.

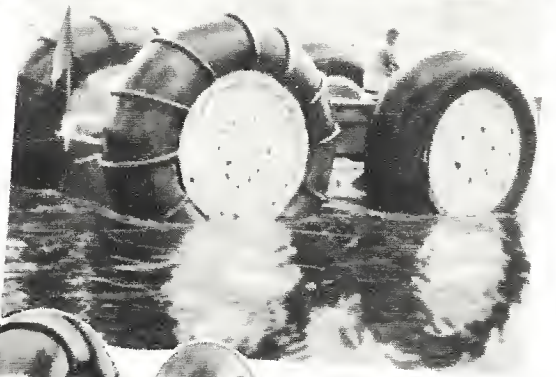
Advancing prices are beyond the control of the architect or builder, but fortunately they are indicative of better times. If anyone contemplates the duplication of the Modern Mechanix Model Home, it is the writer's advice to begin at once before further price rises considerably boost the cost.

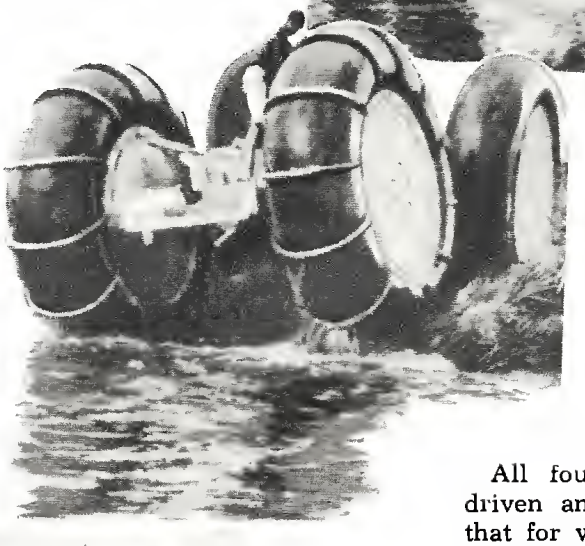
MARSH BUGGY Braves Mud, Water

by Abbot A. Lane
Gulf Oil Company Engineer

WITH ever growing demands for new sources of petroleum there has been a real need, during the last few years, for a suitable vehicle to be used in geophysical exploration of the swamp lands of Louisiana.

The queer looking marsh buggy which E. W. Jacobson and I have designed, meets these requirements. It is equipped with the largest tires ever put into useful service. They are 10 feet in diameter and 33½ inches wide mounted on 66-inch diameter rim. Although of smooth tread, traction is secured by inflatable, detachable cross links.





Licensed as a motorboat as well as an automobile, this strange vehicle roams the swamps of Bayou Lafourche. Though designed for oil prospecting its value for military operations or Coast Guard service in sandy areas may be considerable. The vehicle is fitted with a blower from which air is piped to the tires so that they can be inflated while in progress. Because of the large diameter of the wheels it has been possible to climb the banks of streams one to one and a half feet high.

All four wheels are power driven and the design is such that for water travel it is supported by the buoyancy of the tires, though the total weight is 7,500 pounds. No springs are needed because the tires are only inflated to a pressure of from three to five pounds per square inch and there is ample cushioning.

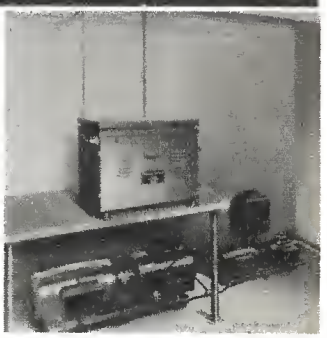
The operator is seated in an elevated position directly over the front axle so that he can see over the large tires. Steering is

[*Continued on page* 144]

Pleasure Yachts Feature Ship-to-Shore Phones

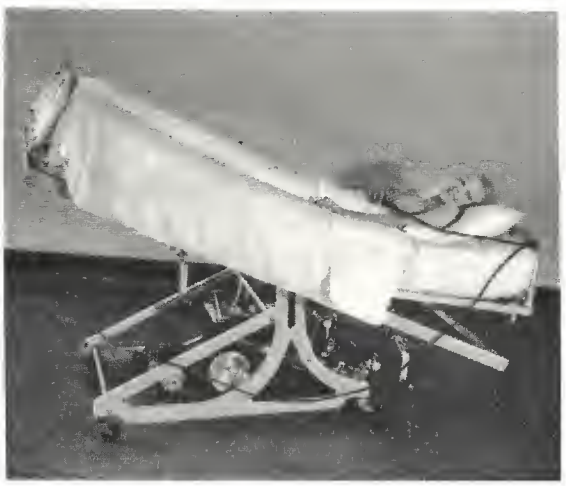
PLEASURE yachts no longer need be without shore communication facilities with advent of a new yacht-to-shore radio-telephone system introduced by the New York Telephone Company in conjunction with the Western Electric Company, designers of the apparatus. This latest contribution to modern communication permits those aboard the craft to call any telephone number on land simply by lifting receiver and asking operator for their party. Until now this service has been costly and limited to ocean-going steamships.

A transceiver located in the hold of the yacht automatically signals the land operator, when the telephone receiver hook is lifted. who immediately replies and puts the call through over the regular dial or manual exchange board. When the call has been completed the transceiver is automatically disengaged until the next call. Yachts equipped with this new system were exhibited for the first time at the recent New York Motor Boat Show.



Telephone communication between pleesure creft end shore phones is possible with this new redio-telephone equipment recently introduced et the New York Motor Boet Show. With the generetor end transmitting epperetus pictured et right cells cen be mede through the neerest lend telephone exchenge system.

Bed Helps Blood Circulate



This motor driven teeter bed is science's letest contribution to humenity. Opereted by either e nurse or the patient, the bed rocks back and forth providing relief from heert congestion.

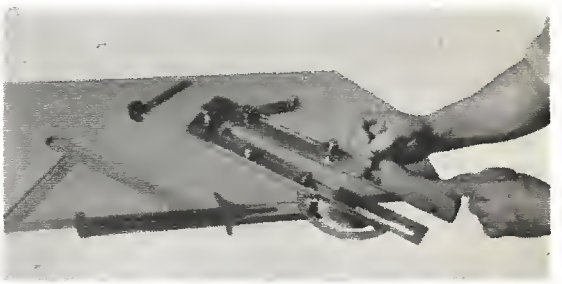
OFFERING almost immediate relief to heart victims a new motor-driven bed, which rocks the patient in teeter board fashion, has been developed for hospital use.

It is the belief of leading medical practitioners that the rocking effect of the "Vasocillator," as the bed is called, will bring persons suffering from a heart attack through the crisis substaining them until the heart is once more able to function normally.

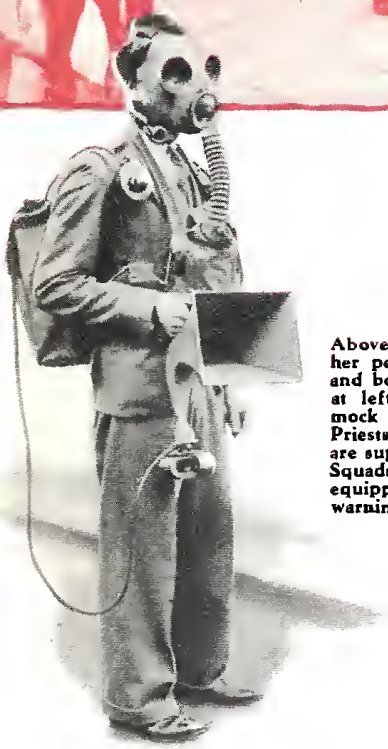
Miter Simplifies Rabbeting

LOOKING more like a draughtsman's instrument than a carpenter's tool a new device recently patented by Frank F. Gravell, Rochester, N. Y., and Edgar A. Gravell, Milford, Conn., performs tasks that many carpenters have thought impossible.

Without plotting off each piece of wood this combination adjustable square and miter permits rabbeting and dadoing of stairs and shelves in one-fourth the time usually required for this work. The tool is so simple in operation that even those without carpenter's experience can use it. Steel push pins hold it rigidly in place during the mitering operation.



An almost impossible tesk for the layman is now simplicity itself with invention of this unique wood-working tool. A flight of steirs can be rebbeted to perfect fit in one-fourth usual time.



GAS MASKS

by Robert Gordon

Above—Japan, too, is preparing her people against possible gas and bombing raids. Cameraman at left is taking pictures of a mock gas raid staged at Tokyo. Priests, soldiers, and civilians are supplied with masks. Left—Squads of volunteer workers are equipped with portable sirens for warning towns of gas attacks.

ENGLAND is manufacturing 30,000,000 gas masks for civilians at the rate of 250,000 per week. By the end of the year they will be stored at convenient centers available for instant use. Italy has decreed that every new house constructed must have a concrete anti-gas shelter in the basement in accordance with government specifications. Masks are sold in Rome on the installment plan.

French drug stores sell masks. Russia has devised special models for children and conducts gas as well as fire drills in schools. Germany and every other European country have provided masks and fume-proof shelters for civilians operating electric power plants and other vital services. A Czech manufacturer is marketing a mask with a telephone and microphone attachment for the conduct of business as usual in spite of gas.

This all goes to show that Europeans, unprotected as America by wide oceans, from hostile nations, have a genuine personal fear of death from the clouds in a general conflict. Just how real the danger is a matter of argument. Gas figured little, if any, in the first six months of the Spanish struggle and it is obvious that the element of surprise, which made the first World War attacks so terrible, is no longer present.

Chemists agree that the most deadly gases are also the most volatile—the most easily blown away. No less an authority than Colonel Adelno Gibson, chemical officer of the Second Corps Area, says that the reports of "super" gases developed since the World War are myths.

Below — English mothers participate in gas drills, donning masks, and conducting their children to gas proof shelters. Right — During a mock gas raid, a French soldier summons aid for his fallen comrade who failed to don mask quickly enough

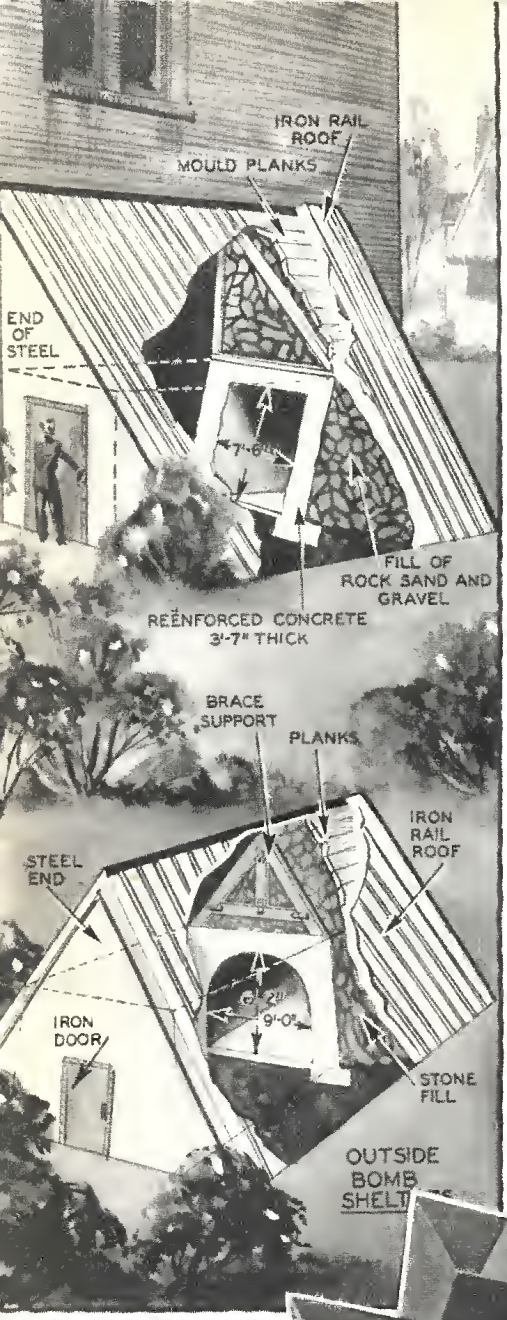
FOR ALL

The possibility of civilians losing morale and being thrown into a panic by gas, however, is everywhere recognized. It is to guard against this that the British have set up an Air Raid Precautions Department as part of the Home Office. In Germany, the National Air Safety League with the slogan "Save Yourself" has distributed 7,500,000 masks to its members. Its most popular model is one selling for $6. The British civilian mask costs the government but two shillings.

What all mititary men know, but what many civilians do not understand, is that the object of an air raid over a large city is to create panic, to cause enough cessation of industry and commerce that armies cannot be supplied, and to so weaken the will of the populace that they will demand peace on any terms without waiting for a decision to be won by their army on the field of battle. Death and property damage are not the end in itself.

The possibilities of destruction by aerial bombing have been greatly exaggerated. During the last nine months of the World War, for instance, according to official figures published in the *Coast Artillery*

Right—In England, gas masks are sold for civilian use at a cost of about 50c each. The respirators are refillable and provide protection for periods up to 12 hours at a time. Below — Proposed gas shelter designed for construction in suburban communities and gardens.



Journal, more than 400 planes took off to bomb Paris. Over half of these planes were brought down before they reached their objective. Those that did release their bombs took a toll of roughly 400 killed and 1,400 wounded.

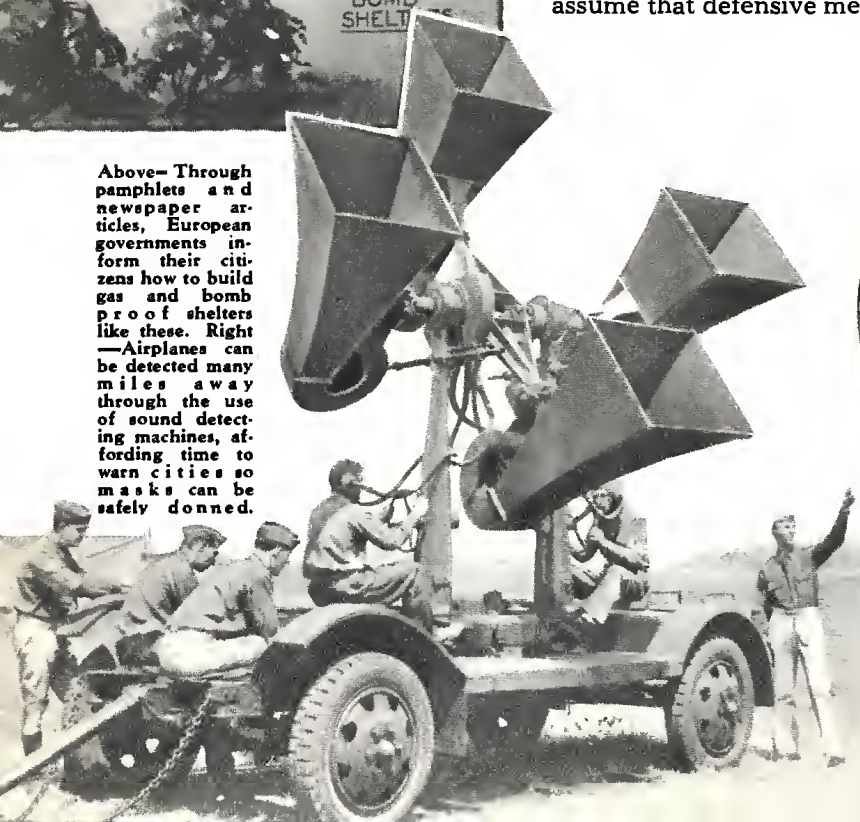
Since then, however, the speed of bombing planes has doubled, their range has been increased five times, and the pay load five times on the most modern types. The largest aerial fleet in existence is the Russian, with 7,000 planes, approximately half of which are bombers.

If we grant that the destructive effect of bombers has increased five times, without any increase in the effectiveness of defensive measures, it would mean that the largest possible raid on a European city would cause about 8,000 deaths and 28,000 wounded. This is a frightful toll, but it is a far cry from the horror pictures so frequently painted, in which a city such as London is wiped out in a few minutes.

But we cannot ignore the rapid development of defensive measures. All European countries today have elaborate defensive zones, bristling with hundreds of searchlights, sound locators, anti-aircraft guns, and airdromes for fast climbing interceptor planes, all connected up with telephonic warning stations, and all cooperating as a unit under one command.

Dr. Hans Brehm, writing in *Luftwehr,* the leading German aviation magazine, says that with a ground defense system organized within a 400-mile zone, a hostile air expedition would be forced to run the gauntlet of 37 anti-aircraft batteries. With only two per cent hits, this would be equivalent to annihilation of the air force.

Dr. Brehm, however, is an anti-aircraft enthusiast, so we may safely discount his optimism, just as we have discounted the pessimism of the aviation zealot. Having granted that bombing planes have increased in efficiency five times since the World War, we may conservatively assume that defensive measures are at least twice as good



Above— Through pamphlets and newspaper articles, European governments inform their citizens how to build gas and bomb proof shelters like these. Right —Airplanes can be detected many miles away through the use of sound detecting machines, affording time to warn cities so masks can be safely donned.

Above—Special masks have been developed for cavalry and artillery horses so they can be utilized during gas attacks that formerly killed them, often effecting the tide of battle.

as they were then, and cut our casualty list in half—4,000 killed and 14,000 wounded.

Strangely enough, the civilian fears gas more than he does high explosives, though casualty lists would indicate that gas is the most humane form of warfare. Dr. Freeth, Chief Rerearch Chemist, Imperial Chemical Industries, says:

"The amount of nonsense talked about poison gas is beyond belief. Chemical warfare has such a hold on the imagination of the civilian population that the main danger is psychological."

Captain B. H. Liddell Hart, noted British military expert, says: "The death rate among gas casualties during the World War was less than four per cent. Its outstanding effectiveness lay not in killing, but in hindering and upsetting military plans. It was a first class nuisance." As compared with this, less than 63 per cent of the casualties by high explosive lived, and many of these were maimed for life.

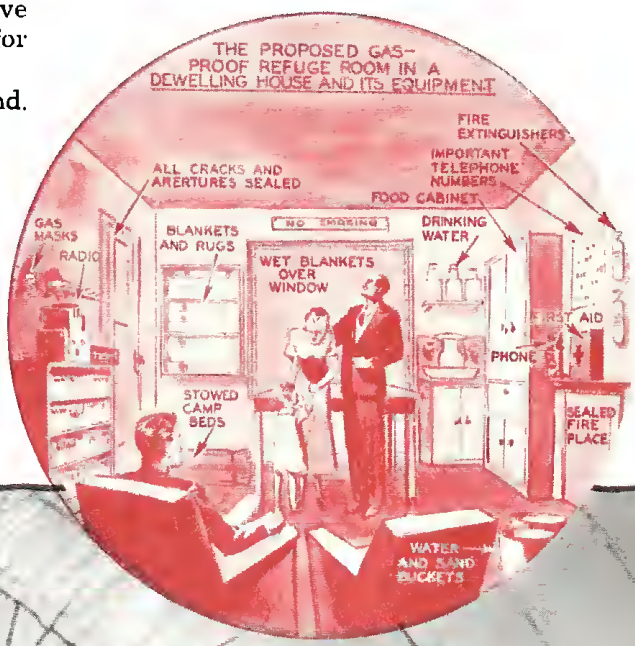
The Reverend Julius Arthur Nieuwland. Belgian-born professor of organic chemistry at Notre Dame University, and one of the inventors of Lewisite gas, was quoted in *Time* as saying: "Poison gas is a humane instrument of warfare. By the introduction of gas and other modern instruments of warfare, a progressively smaller percentage of combatants has been killed.

"In Biblical times, thousands of men met in the middle of a plain and slashed one another until only a few were left standing. Today, the primary aim is not to kill but to incapacitate. And poison gas is an ideal way of achieving that aim.

"If a man goes to the hospital suffering from gas he is as useless as if he were dead—and to care for him, several other persons must be kept out of the battle lines. The chances are that ultimately the victim will recover."

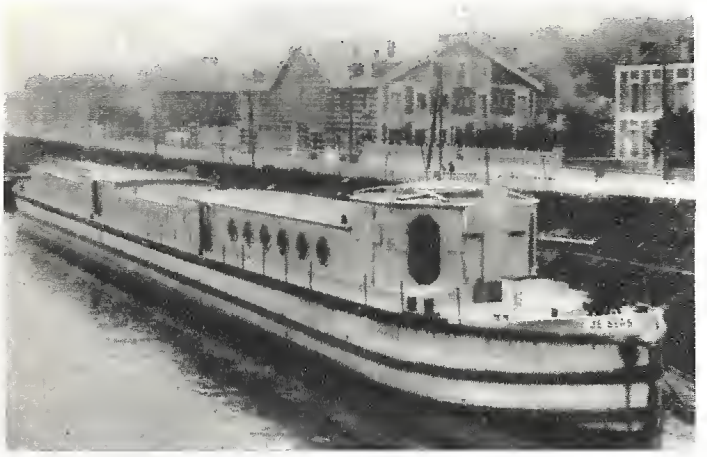
The author, having been both wounded and gassed during the World War, heartily endorses Father Nieuwland's theory. The acquiring of a most effective case of mustard

[*Continued on page* 142]



Circle—Interior of proposed shelter room showing supplies end errengement to provide 12 hours protection without need of ventilation. Wet blenkets guerd the entrence to shelter rooms egeinst penetretion by fumes. Below—Women entering an impermeeble French "belloon" type gas shelter. Infleted by e pneumetic pump, it is quickly set up.

Floating Church Serves French Sailors Ashore



Built on e converted berge, this floating chepel is intended to make seilors feel "et home" in church. Unique ship trevels from port to port on coasts and rivers of Frence.

WANDERING from port to port along the French coast and on the inland waterways is a queer craft designed as a floating chapel for mariners. Built on an old barge, it has been specially designed to make seamen feel "at home" when at church. While many seaports throughout the world have their churches for sailors, these are built on land near the docks. Experience showed clergy working among French seamen that sailors were more at ease with the feel of a "rolling floor" under them, and the floating Church, "Je Sers" (I Serve) has proven much more popular than the land chapels.

Serving sailors on Sundays, however, is only a part of its mission. The barge chapel is also used as a meeting place for seamen throughout the week, providing entertainment, reading rooms with current newspapers, magazines and books, and other facilities of a club and keeping mariners who are ashore healthily amused.

Factory Has Its Own Train

GREATLY speeding up trips of workmen between various shops, and allowing a quick transportation of buyers and visitors, a miniature train hauled by a small auto truck has been installed by Lister and Company, an engineering firm of Dursley, Gloustershire, England. The passenger car carries ten people and the entire "train" can chuff through narrow passages between buildings where it would be impossible for an ordinary auto to travel. Besides providing visitors with a novel ride and tour of the plant, the train is very economical to run. It consumes only two gallons of gasoline in eight hours' running. Self-rolling canopies for sun and rain shelters add to its comfort.

Seving the time of workers, buyers end visitors, this auto truck end treiler is used for trensportetion where eutos ere impracticel in English engineering fectory.

Garden Shoes From Tires

MUDDY feet is the biggest woe of the lady gardener. But one English woman solved the problem, and her scheme is fast catching on in a country where every woman prides herself on her garden.

Gardening tip from England: Two lengths from old tire end a peir of boot leces meke gerdening "shoes."

An effective pair of covers to keep shoes clean and dry while tending to the garden in inclement weather was made of two pieces of rubber from an old tire, plus a pair of boot strings. Those who have worn them insist they are not as awkward as they look. With their large surface, the shoes do not sink into soft ground, marring flower beds.

Fun At The Dinner Table

A doughnut dunker dunking e doughnut. The holding erm prevents burning of fingers; the drip cup cetches excess coffee, pours it beck into cup.

Mechenicel speghetti wrestler thet teckles the slippery food end ties it into fancy, non-slipping knots. Device is e sewed-off fork end egg beeter to twist it.

Corn eeting gedget butters cob et single twirl, rings gong when end of row hes been reeched, and ellows eeter to keep one hend free.

SOUP serenades, spaghetti entanglements, corn-on-the-cob wrestling and other embarrassments at meal time may never be eliminated, but Russell Oakes, a Waukesha, Wis., business man, got so amused thinking they might be that he discovered a new hobby devising dizzy devices to put eating on a mechanical basis.

Oakes' simplest invention, for those who *must* eat peas with a knife, is a cylinder that fits on the blade and allows the little legumes to roll, single file, into the mouth. A hiss-less soup is created by a funnel spoon.

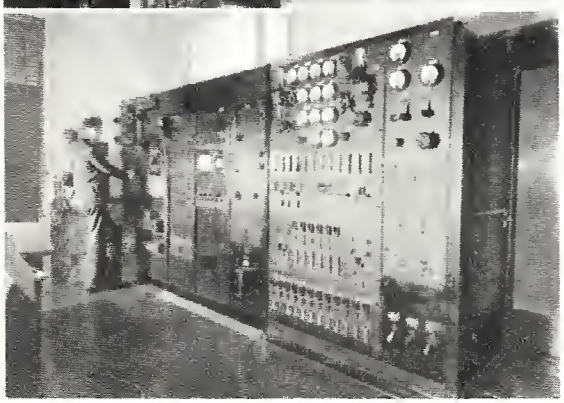
For dunkers, Oakes has a delirious device that hooks a doughnut onto a pivotal bar. As the cake is dunked a thumb lever places a drip pan under it. After the feast the pan pours the coffee drippings back.

A corn-on-cob feeder is Oakes' trickiest invention. It is a cylindrical holder with a lateral eating slot. A funnel on top, which melts butter by the heat of the corn, spreads the cob. The eater holds the device in one hand while his other is left free to use in conversation. A bell, swatting the cheek, indicates when the end of the cob has been reached, signals to start on another row of golden kernels. Spaghetti wrestling is made easier with a self-winding fork operated by an eggbeater. The gear turns the fork, spins the spaghetti into a perfect knot.

NBC Proves Television Practical

Television announcers must not only speak well, but be attractive, too. Here is Miss Betty Goodwin, NBC's television announcer.

Television is photographed under the same conditions as a motion picture except that an Iconoscope camera is used. This scene is being photographed in the Radio City Television Studios. Left—A typical television set.



Located atop the Empire State Building in New York is the huge Television transmitter used by NBC. Lower picture shows the elaborate television control room apparatus.

TRANSMITTING television movies across Metropolitan New York the National Broadcasting Company recently proved that this new science had definitely left the laboratory and was ready to be offered to the American public. More than two hundred spectators gathered around television receivers set up in the sixty-second floor of the RCA Building in New York City to watch the thrilling broadcast, which included both live talent and movies.

The program originated in the television studios of the National Broadcasting Company and was transmitted over coaxial cable to the television sending apparatus located atop the Empire State Building. Here a transmitter operating on 343-line definition sent the television pictures out over the air to be picked up by the receivers located high up in the RCA Building.

Although the broadcast exceeded the wildest expectations of the newspaper representatives who attended the demonstration it will still be several years before television will be offered to the public due to complications which must be remedied. A standard line definition must be decided upon and permission of the Federal Communications Commission secured for commercial broadcasting.

CCC Boys Accomplish Vast Forest Spraying Job

SPRAYING three and one-half million acres of the Superior National Forest in Minnesota with a solution of lead arsenate to protect the trees against the ravages of tent caterpillars is the job accomplished by members of the Civilian Conservation Corps. Seven mobile spraying outfits were used and the poison was spread at the rate of 400 gallons per minute.

The CCC boys penetrated deep into the forest, even in areas 180 miles away from the nearest railroad, in their efforts to destroy the pests.

Top—Mobile spraying units enabled CCC boys to spread insect poison over 3½ million acres of Superior National Forest, Minnesota, at rate of 400 gallons per minute. Lower—Spray in action. Pests eat enough poison in 24 hours to cause death.

Electro-Gas Lamp Kills Bugs

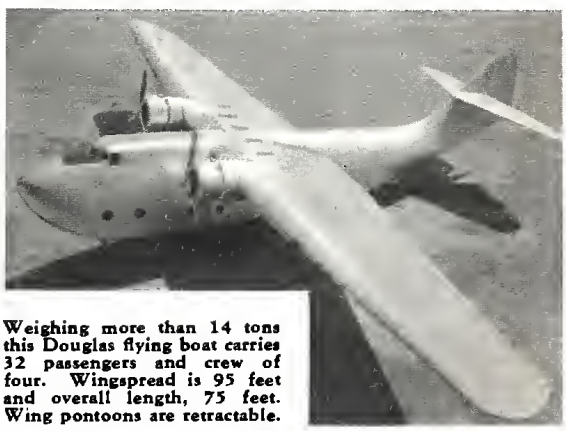
This lamp aids California farmers by destroying insects attracted by its glow. Insects strike electrically charged screen covering lamp, cause short circuit and are electrocuted.

PROVING of great value to California fruit and vegetable farmers, a lamp invented by Dr. W. B. Herms and Joe K. Ellsworth of the University of California, destroys insects attracted by its glow. The lamp has a gas filled coil which glows when electrified. An electrically charged screen covering the coil becomes short circuited when insects fly against it, electrocuting them instantly.

Giant Seaplane Developed

POWERED by two Wright Cyclone engines of 1,000 horsepower each, an advanced type of giant flying boat has been developed by the Douglas Aircraft Co., of Santa Monica, Calif. The huge seaplane has a wingspan of 95 feet, and its hull is 75 feet long.

The huge plane carries 32 passengers and crew of four. Cruising range is 3,200 miles at 167 m.p.h. Top speed is 185 m.p.h.



Weighing more than 14 tons this Douglas flying boat carries 32 passengers and crew of four. Wingspread is 95 feet and overall length, 75 feet. Wing pontoons are retractable.

PULLING

Above—Parachutes have changed war tactics. In Russia, army maneuvers include mass jumping by hundreds of soldiers who practice landing behind the "enemy" lines where they can attack and harass the foe from the rear.

WITH an ambulance in readiness and the air tense with excitement, a 22-year-old daredevil named Leslie Irvin soared above McCook Field at Dayton, Ohio, on April 28, 1919, to make the first live parachute jump. Balloonists and German war airmen had used static parachutes but the new cord-released device devised by Irvin and Floyd Smith, who flew him on this memorable flight, was an unknown quantity.

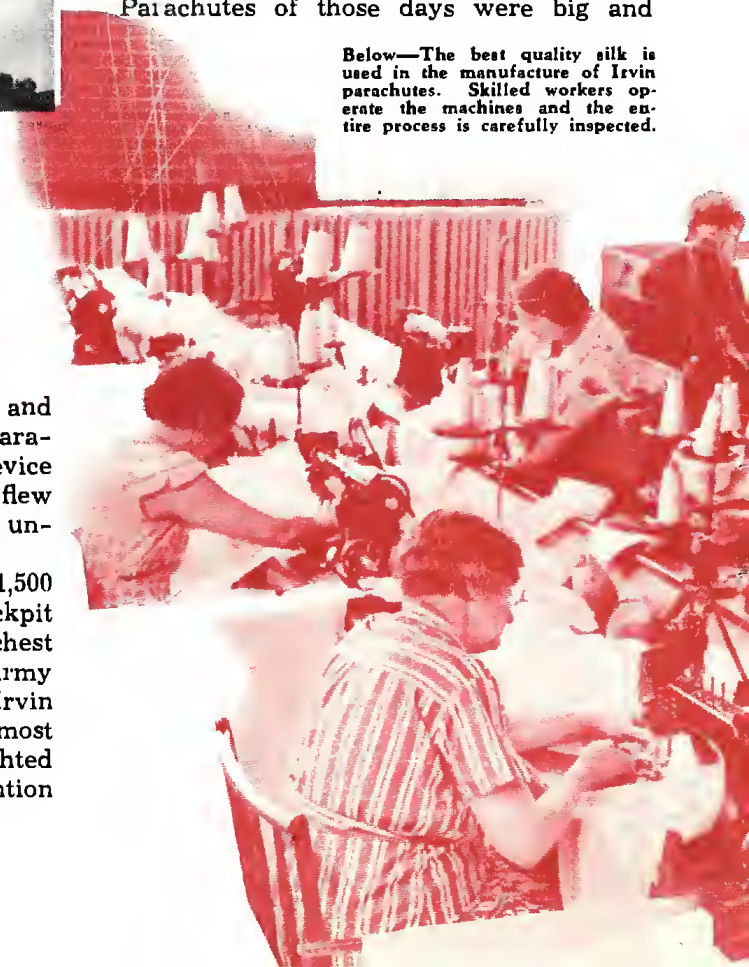
As the De Havilland plane reached 1,500 feet, Irvin clambered out of the rear cockpit with a second parachute strapped to his chest should the one at his back fail. Army officers below held their breath as Irvin fell backward from the ship head first. Almost instantly the parachute opened. So delighted was Irvin at this that he paid little attention to his descent and broke an ankle in landing.

This morning exploit 18 years ago proved deeply significant. Because of it, Soviet Russia's war plans include the landing behind defenses of fully equipped soldiers from the clouds! Because of it, 805 pilots have survived mishaps to become members of the Caterpillar Club. Finally, as a result of his adventure, Irvin today is parachute maker for the entire world.

Leslie Irvin was in his middle teens when he made up his mind to see life as an adventurer. To the horror of his parents, who then resided in California, he decided to become a stunt man for the motion picture industry, then in its infancy.

For several years he followed that hazardous occupation. He did the "slide for life" clinging by his teeth to a leather mouthpiece as he slid down to earth from dizzy heights. He rode a motorcycle in the "globe of death." But best of all he loved to make balloon flights and parachute drops. (So skillful was he at this neck-risking pastime that the French government commissioned him a balloon pilot when he was but 16 years of age.)

Parachutes of those days were big and



Below—The best quality silk is used in the manufacture of Irvin parachutes. Skilled workers operate the machines and the entire process is carefully inspected.

the RIPCORD

by P. D. Fahnestock

Col. Lindbergh, as well as many other famous pilots, owes his life to Leslie Irvin, for his parachutes have saved the noted flier on four emergency occasions.

Leslie Irvin, designer of the Irvin Air Chute. Mr. Irvin's boyhood fascination for parachute jumping led him to manufacturing and perfecting a parachute that is now used throughout the world. Many pilots will wear no other type.

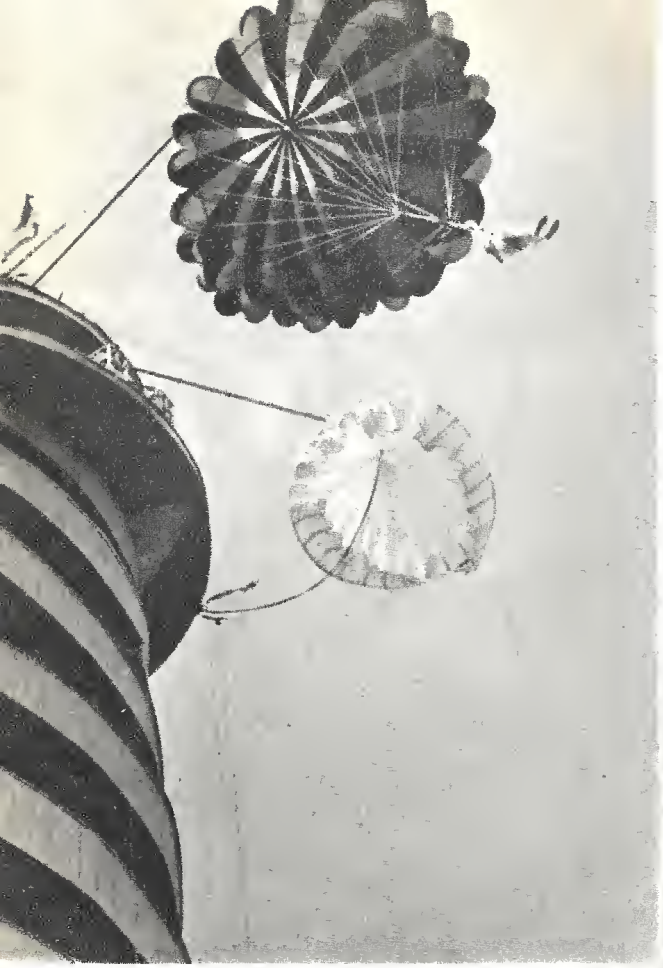
Parachute jumping is part of the training of U. S. Navy and Army aviators. Above—A Naval flier making a head first plunge from a DH training plane. The jumper waits until he is fully clear of the plane before pulling the ripcord to release parachute.

clumsy. They were attached to the sides or bottoms of the balloons. Sometimes they were torn off as the balloon left the ground. Sometimes they didn't open or couldn't be detached. Young Irvin thought they were pretty crude and gave serious thought as to how they could be improved.

Houdini had shown him such parlor tricks as concealing large silk flags and handkerchiefs in tiny spaces. This gave the young man an idea. Why not make a parachute out of silk and fold it up so that it could be worn in a small pack? He set about to make his first parachute and soon had it ready for trial.

In an effort to demonstrate his device Irvin had gone to Buffalo where the Curtiss company had been making airplanes in great quantities for the Allies. From Buffalo, he had been directed to Dayton where Major E. L. Hoffman of the Air Service, Floyd Smith and others had been experimenting with safety devices.

"Your device is all right but we have no money for such things, there is nothing in the budget for parachutes," a junior officer who had arranged the demonstration declared.



Above—A parachute training tower in Moscow, Russia. The student is released in an opened chute and descends to the ground, gaining experience in guiding the chute, making ground contact, and building up confidence for real plane jumps.

"To hell with the budget, we want 25 of those parachutes right away," Gen. William Mitchell, impressed by the jump, ordered.

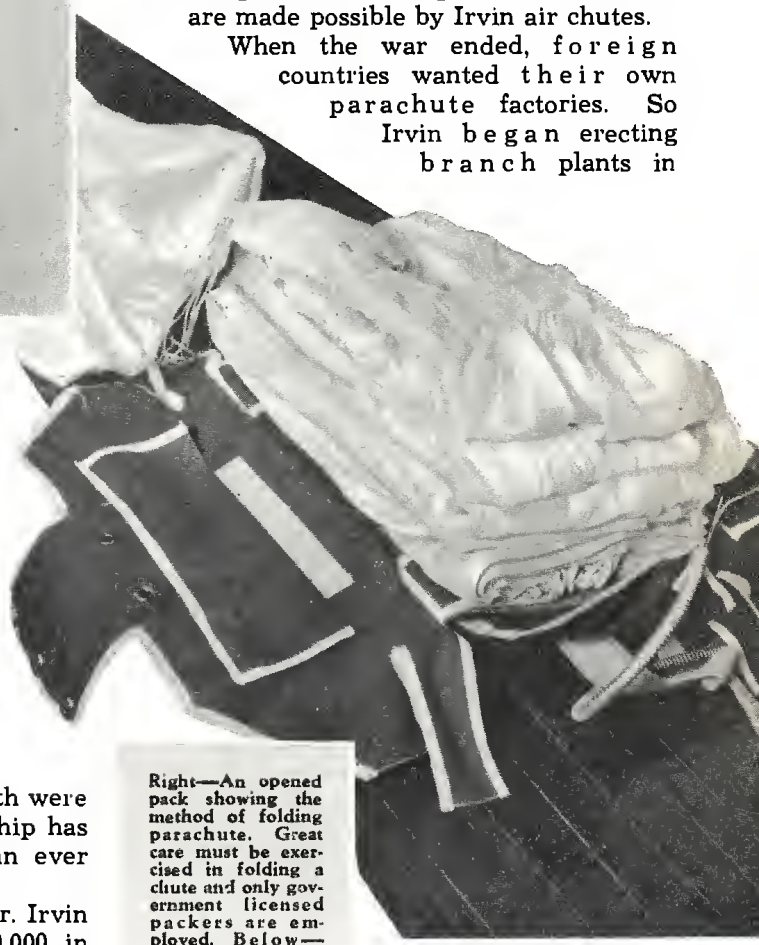
So back to Buffalo went Irvin, without funds to make even one parachute, to say nothing of 25. But he had a friend, George Waite, who ran a silk store in that city. Waite was interested, knew silks and their strength, decided to go along. That was in World War days when they both were in early manhood. But the partnership has continued and is stronger today than ever before.

In the boom days of the market, Mr. Irvin and Mr. Waite each received $1,250,000 in cash for partial interest in their company. A big stock issue was marketed at that time and they lost control of operations of the Irving Air Chute Co. A stenographer's error at the time incorporation papers were filed accounts for the difference in spelling. Irvin lacked money for new papers at the time and the error has never been corrected.

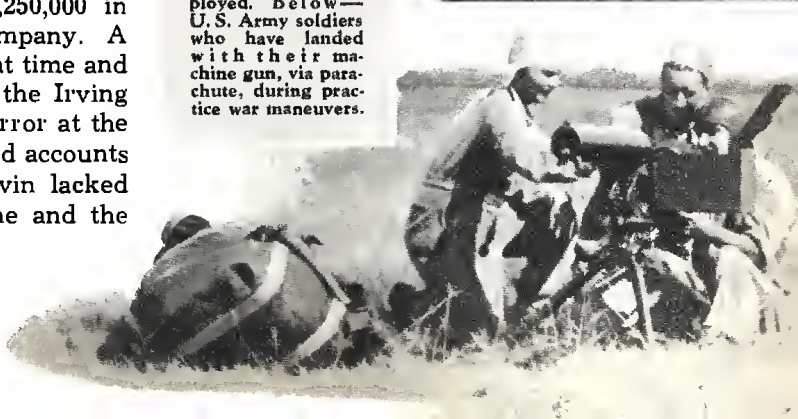
Production was begun and orders piled in from many governments. The inventor saw great possibilities in his chutes as weapons in addition to their value as life savers. He proposed that the Army provide shock troops with parachutes for descending behind enemy lines. He also suggested attaching machine guns to parachutes and dropping them behind enemy lines for use in rear attacks on the foe, etc.

His proposals, turned down cold at that time, are today part of the Soviet Union army training. In that country, young men and women desiring to gain medals for all 'round athletic ability must be successful in parachute drops as one of the major requirements for this honor. The mass flights seen in motion picture films imported from Russia are made possible by Irvin air chutes.

When the war ended, foreign countries wanted their own parachute factories. So Irvin began erecting branch plants in



Right—An opened pack showing the method of folding parachute. Great care must be exercised in folding a chute and only government licensed packers are employed. Below—U. S. Army soldiers who have landed with their machine gun, via parachute, during practice war maneuvers.



Lieut. Harold A. Harris, U. S. A. C., is credited with being the first military aviator to make a forced parachute jump (in 1918). Since then, hundreds of army and navy pilots have saved their lives by use of a parachute.

Left—An unusual action photo showing a jumper immediately after leaving a plane. He has pulled the ripcord handle with his left hand, and small pilot-chute has left pack, dragging large chute after it.

Above—A Soviet Army service dog floating to earth with a parachute. In time of war, the dogs would carry messages, first aid equipment, etc. Food and ammunition supplies are dropped in the same manner as part of modern war tactics.

other countries. England wanted to manufacture under royalties and this was done. Mr. Irvin supervised the opening of the British plant, also others in half a dozen foreign countries. He remained to reside on British soil although he still claims Kenmore, a Buffalo, N. Y., suburb, as his home.

A great plant in Russia turns out thousands of parachutes each year. Sales of the Buffalo, N. Y., plant run well in excess of $1,000,000 annually. From the beginning of the sale of the chutes to civilians, Irvin's fame spread.

Four times, Col. Charles A. Lindbergh saved his life by parachute jumping out of mail planes which were about to crash. When Col. Lindbergh went to Buffalo after his flight across the Atlantic his first request was to

[*Continued on page* 157]

EXPLORING the BOTTOM of the OCEAN

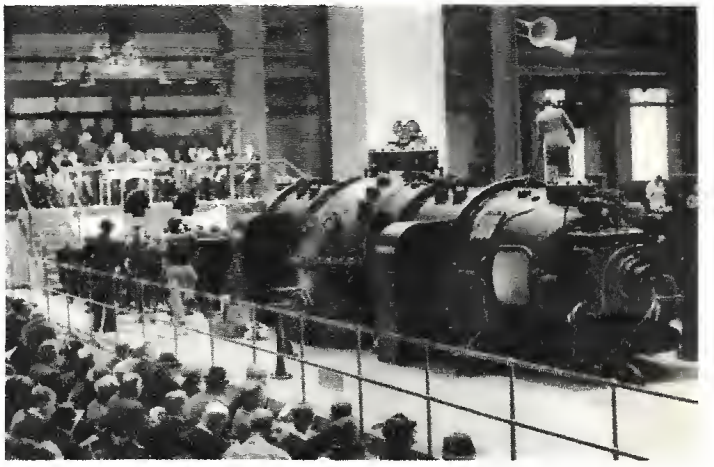
TO CONDUCT GRAVITY TESTS "SUB" MUST SINK TO A DEPTH OF ABOUT 80 FEET WHERE WATER IS FAIRLY CALM, AND THE PENDULUMS CAN SWING EFFICIENTLY EVEN THOUGH THE BOAT SHOULD ROLL AS MUCH AS SIX DEGREES
BOX CONTAINS PHOTO-GRAPHIC DEVICE
PENDULUMS ENCLOSED IN CABINET
INSTALLATION OF TESTING APPARATUS IN THE CONTROL COMPARTMENT OF THE BARRACUDA
CUBA
HISPANIOLA
BARTLETT DEEP
JAMAICA
PORTO RICO
NARES DEEP GREATEST MEASURED DEPTH IN THE ATLANTIC OCEAN
EXPEDITION MAY DISCOVER ANOTHER "DEEP" HERE
EXPEDITION ENDS AT ST. THOMAS, VIRGIN ISLANDS
CARIBBEAN SEA
GREAT STRESSES IN EARTH'S CRUST MAY BE HERE
CIRCLES SHOW POINTS WHERE TESTS WILL BE MADE
COCO SOLO, PANAMA, STARTING POINT
CONTINUOUS RECORDS OF DEPTH WILL BE MADE WITH THE SONIC DEPTH FINDER
DEPTHS AROUND 5 MILES HAVE BEEN FOUND IN THE NARES DEEP
LOCATION OF THE BARRACUDA'S "GRAVITY STATIONS"
THE FINDING OF A REDUCED PULL OF GRAVITY OVER THE GREAT "DEEPS" SHOULD REVEAL STRESSES IN THE EARTH'S CRUST INDICATING GREAT DANGER OF EARTHQUAKE AND VOLCANIC ACTIVITY
UNEVEN STRUCTURE OF EARTH'S CRUST THROUGH FOLDING REVEALED BY A REDUCED PULL OF GRAVITY. THE PENDULUMS SWING FASTER
COMPACTNESS OF CRUST MEANS A STRONGER PULL OF GRAVITY. THE PENDULUMS SLOW UP
FIRM CRUST HERE
UNSTABLE CONDITION OF CRUST
PARIS
CAYENNE
FLATTENING OF EARTH AT POLES GIVES DIFFERENT PULLS BY GRAVITY. M. RICHER'S PENDULUM CLOCK AT CAYENNE LOST 2 MINUTES AND 28 SECONDS A DAY FROM PARIS TIME

The story of what is happening to the earth's crust beneath the inky blue Caribbean, is being unfolded to scientists exploring the ocean floor in the Navy submarine Barracuda on a 6,500 mile survey, under the direction of Captain L. R. Leahy. The Dutch scientist, F. Vening Meinesz, devised the pendulum apparatus to reveal minute crustal densities and ocean topography as a clew to cause of earthquakes.

Giant Generators To Supply London Electricity

TO HELP supply the ever increasing demand for electricity in the city of London and its suburbs, the English government has opened a new power generating station in the nearby town of Fulham. The station has a total capacity of 130,000 kilowatts, making it one of the most powerful electric generating plants in Europe.

The plant equipment consists of two turbo-alternators of 60,000 kilowatts each and a house generator of 10,000 kilowatt capacity. The station constitutes another link in the chain of power plants built up around London in the belief that a series of stations will offset the possibility of London's electric power being destroyed by aerial bombing in event of war.

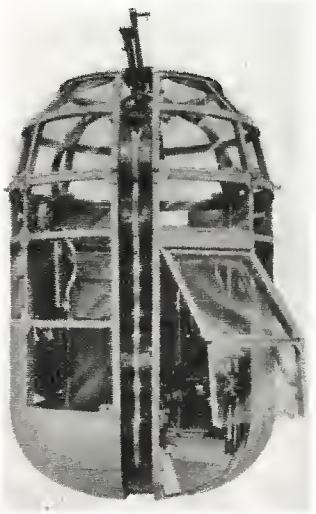


New giant generators will make Fulhem, England, power stetion one of most powerful in Europe with cepecity of 130,000 kilowatts. Photo shows mayor and civic officiels et dedicetion.

Gunner's Turret Has Zipper

A GUNNER'S turret developed for use on huge bombing planes of the British Royal Air Force protects the gunner from the wind and cold by means of a zipper fastener that closes the gun slit when not in use. When unfastened, the gunner can aim the gun up or down with minimum effort.

The gunner sits on a chair connected to the gun in such a manner that his weight just balances that of the gun. As the gun goes down, the gunner's seat rises. The seat and gun can be locked in any position and each can be adjusted to operate with gunners of varying weights. The turret automatically turns in unison with the aiming of the gun from right to left. The entire apparatus is actuated by an engine driven air compressor device.



Zipper fastener on this gun turret protects gunner from wind end cold. Turret features balanced seat that reises and lowers es gunner aims the gun up or down.

Builds Low Cost Shantyboat

AT A COST of less than $500, Ira Hillier, of Montello, Wis., constructed a shantyboat providing living and sleeping quarters for six persons. The construction of the novel craft features a used car motor, a steel scow, enough presswood to build a cabin, a paddle-wheel, and two rudders.

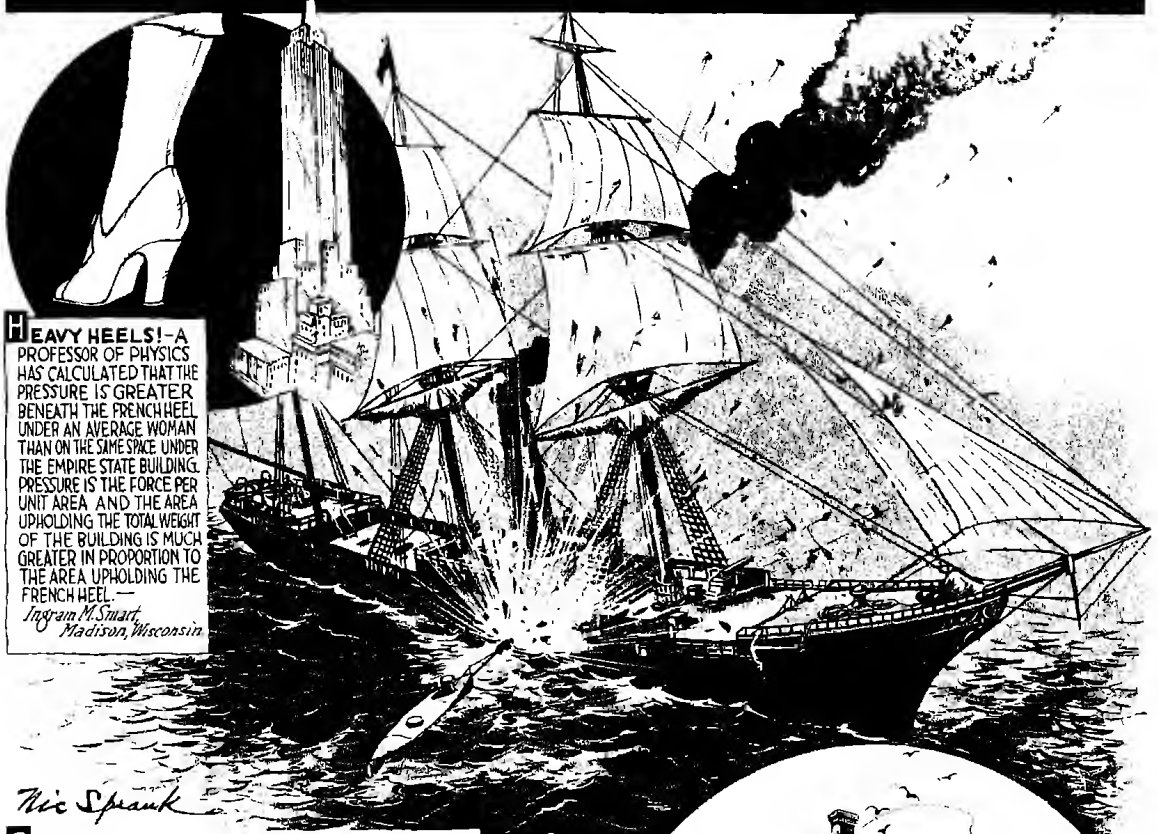
The paddle-wheel mounted at the stern propels the shanty-boat at a speed of 5 m.p.h., power being transmitted from the auto engine by a chain-drive employing a 5 to 1 gear ratio. Two rudders insure easy steering and absence of a keel makes it possible to float the boat in as little as 9 inches of water.

Electric lights are operated by a storage battery hook-up. Ample kitchen and cupboard space is provided and a promenade deck surrounds three sides of the cabin. As many as 21 persons have been carried aboard the boat at one time.

Ire Hillier, Montello, Wis., edds finishing touches to shantyboat he constructed by placing cebin eboard steel scow. Used auto engine powers peddle wheel through use of chein drive.

Submarines Used In Civil War

Nic Sprank Offers $5.00 For Best Oddity

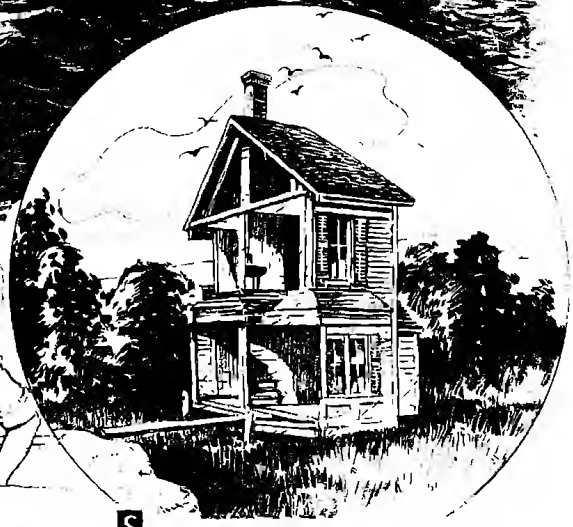


HEAVY HEELS!—A PROFESSOR OF PHYSICS HAS CALCULATED THAT THE PRESSURE IS GREATER BENEATH THE FRENCH HEEL UNDER AN AVERAGE WOMAN THAN ON THE SAME SPACE UNDER THE EMPIRE STATE BUILDING. PRESSURE IS THE FORCE PER UNIT AREA AND THE AREA UPHOLDING THE TOTAL WEIGHT OF THE BUILDING IS MUCH GREATER IN PROPORTION TO THE AREA UPHOLDING THE FRENCH HEEL.—
Ingram M. Smart, Madison, Wisconsin

Nic Sprank

CONFEDERATE SUB SANK FIRST SHIP! A CRUDE SUBMARINE CALLED THE DAVID, BUILT BY H. HUNDLEY OF MOBILE, ALA., TOOK THE FIRST TOLL OF SURFACE CRAFT BY SINKING THE U.S.S. HOUSATONIC, THEN BLOCKADING THE CHARLESTON, N.C., HARBOR, WITH A SPAR TORPEDO ON THE EVE'NING OF FEB. 17, 1864.—THE SUBMARINE BECAME ENTANGLED WITH THE WARSHIP AND ALSO SANK. THE CONFEDERATE CREW PERISHED, *Robert Smith, Charleston, S.C.*

ORIGIN OF COCKTAIL! THE STIRRING OF A NEW DRINK WITH THE FEATHER OF A ROOSTER ABOUT THE TIME OF THE AMERICAN REVOLUTION IS CREDITED WITH GIVING THE 'COCKTAIL' ITS NAME.—
Mollie Mendelson, Tallahassee, Fla.



SAW HOUSE IN HALF!—WHEN THE JOINT OWNERS OF A BUILDING ON U.S. HIGHWAY NO. 1 NEAR NEWBURYPORT, MASS., FAILED TO AGREE ON A PROPOSAL TO SELL THE STRUCTURE TO THE COMMONWEALTH, ONE SOLD HIS HALF AND IT WAS CUT AWAY.—*John H Bonzagni, East Boston, Mass.*

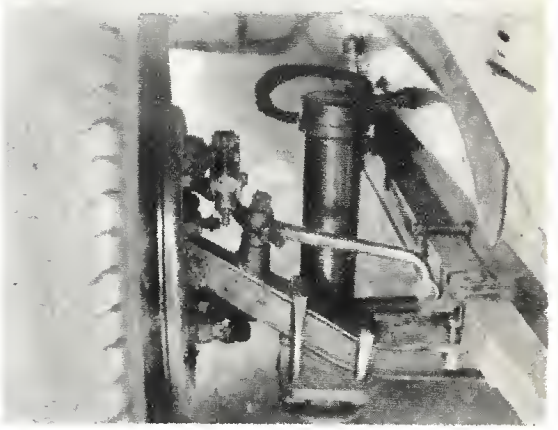
Five dollars will be paid for the oddity used by Nic Sprank as his central illustration. One dollar will be paid for all others used on this page. Send your oddity to Nic Sprank, Modern Mechanix Publishing Company, Fawcett Bldg., Greenwich, Conn. Source or proof of each oddity must be given. Send all oddities separately, not with other manuscripts or letters.

Invents Built-In Jacks For Automobile Use

HYDRAULIC jacks that can be attached permanently to an auto near each wheel have been invented by Erwin T. Bryant, of Farley, Mass. Operated individually by four small valves on the dashboard, the jacks are speedy in operation and can lift the wheels clear of the ground in less than five seconds after power has been turned on.

Each jack consists of a 2-inch outside cylinder, a 1¼-inch inner cylinder that telescopes into the outer one, and a 1¼-inch piston. The hydraulic medium, a light oil, expands the piston to its limit and then extends the telescoping cylinder. Entire mechanism is actuated by a small hydraulic pump geared to the transmission.

The hydraulic pump develops pressure of 800 pounds per square inch, giving the four inches of working surface in each jack a lift of 3,200 pounds, or a total lift of 12,800 pounds for the four jacks.



Top—Erwin T. Bryant, of Farley, Mass., shows built-in hydraulic jacks he invented for autos. Jacks are operated by valves on dashboard. Lower—Position of jack when inactive.

Pulley System Speeds Data

Left—Motor driven rope-and-pulley carries cylinder containing messages between Harvard University buildings. Right—Helen Atwell, laboratory secretary, prepares to send message.

TO SPEED written messages and other data between buildings at Harvard University in Cambridge, Mass., Dr. Harry Rowe Mimno, assistant professor of physics, developed a mechanical carrier system operated by a motor driven rope-and-pulley.

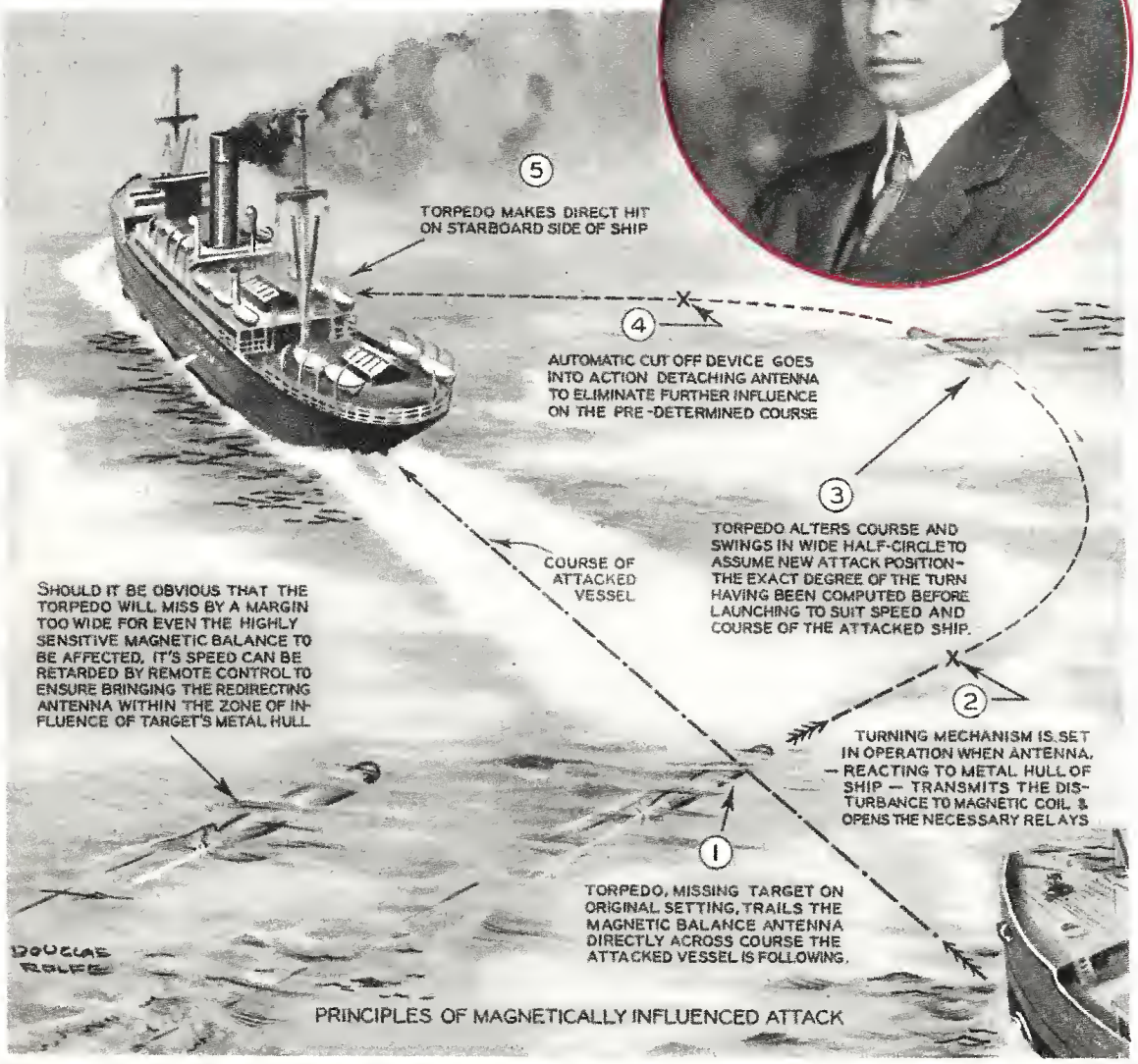
Messages are placed in an aluminum cylinder and carried between buildings by the motivated rope-and-pulley system. Upon reaching its destination, the cylinder causes a red light to flash, informing office personnel that message is waiting.

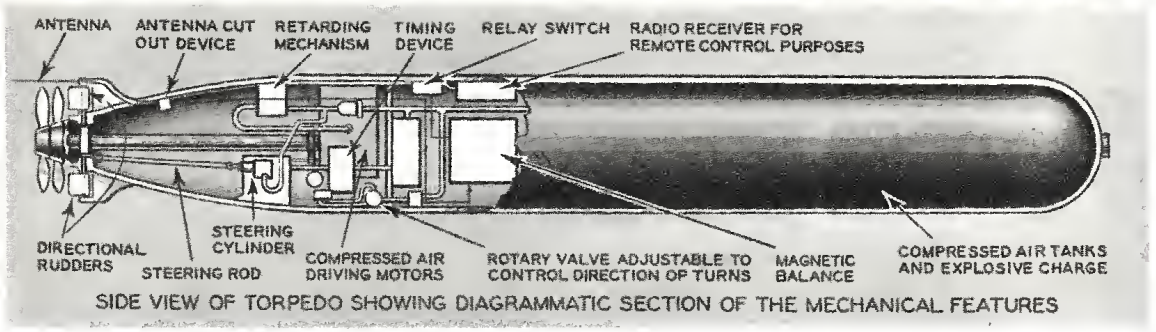
Juvenile Star Builds Auto

CONSTRUCTED of wood and featuring miniature balloon tires, a novel midget auto has been built by Frankie Thomas, young stage and screen star. Power is supplied by a half-horsepower motor using a battery with glass-clad plates, a type of battery construction long used on battleships and now adapted for automotive use. Spun glass plates permit free flow of acid.

Capable of traveling 20 m.p.h., this midget auto was built by Frankie Thomas, stage and screen star, at cost of less than $100. Power is supplied by small half-horsepower motor.

DEADLY TORPEDO MAKES DUAL ATTACK ON SHIPS


5
TORPEDO MAKES DIRECT HIT ON STARBOARD SIDE OF SHIP
4
AUTOMATIC CUT OFF DEVICE GOES INTO ACTION DETACHING ANTENNA TO ELIMINATE FURTHER INFLUENCE ON THE PRE-DETERMINED COURSE
3
TORPEDO ALTERS COURSE AND SWINGS IN WIDE HALF-CIRCLE TO ASSUME NEW ATTACK POSITION— THE EXACT DEGREE OF THE TURN HAVING BEEN COMPUTED BEFORE LAUNCHING TO SUIT SPEED AND COURSE OF THE ATTACKED SHIP.
COURSE OF ATTACKED VESSEL
SHOULD IT BE OBVIOUS THAT THE TORPEDO WILL MISS BY A MARGIN TOO WIDE FOR EVEN THE HIGHLY SENSITIVE MAGNETIC BALANCE TO BE AFFECTED, IT'S SPEED CAN BE RETARDED BY REMOTE CONTROL TO ENSURE BRINGING THE REDIRECTING ANTENNA WITHIN THE ZONE OF INFLUENCE OF TARGET'S METAL HULL.
2
TURNING MECHANISM IS SET IN OPERATION WHEN ANTENNA, — REACTING TO METAL HULL OF SHIP — TRANSMITS THE DISTURBANCE TO MAGNETIC COIL & OPENS THE NECESSARY RELAYS
1
TORPEDO, MISSING TARGET ON ORIGINAL SETTING, TRAILS THE MAGNETIC BALANCE ANTENNA DIRECTLY ACROSS COURSE THE ATTACKED VESSEL IS FOLLOWING.
DOUGLAS RELFE
PRINCIPLES OF MAGNETICALLY INFLUENCED ATTACK



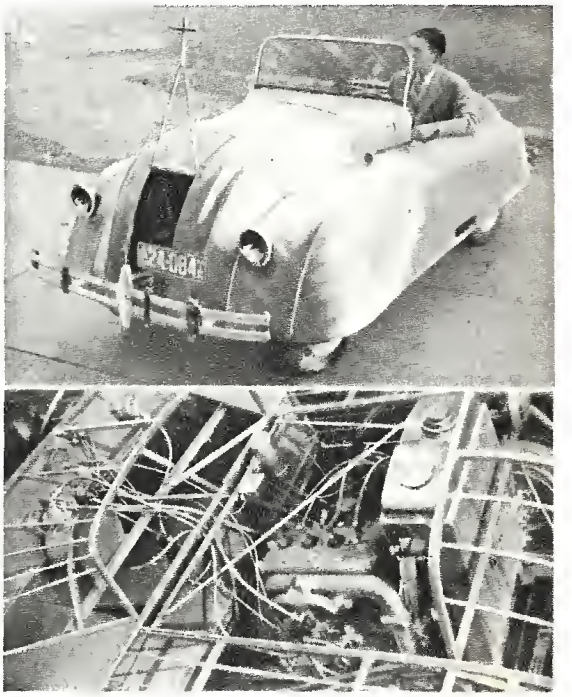
A torpedo that turns and attacks again if it misses target on first attempt has been invented by John Hays Hammond, Jr., (circle) of Gloucester, Mass., who already has 385 successful patents registered. Upon missing ship initially aimed at, a self-contained magnetic balance sensitive to masses of metal—such as in a ship's hull—actuates the torpedo's steering mechanism as soon as the missile has crossed the course line of the ship attacked, causing the projectile to swing in a wide circle toward the fleeing vessel to strike it from the opposite side. Artist's sketch shows attack technic.

Midget Auto Features Fabric Covered Framework

CONSTRUCTING a fabric covered framework over an Austin auto chassis, Nelson Cornelius, of Minneapolis, Minn., has developed a novel car featuring pneumatic springs in place of the usual metal springs. The new type springs consist of a piston-in-cylinder arrangement operated by an air compressor, and a valve mechanism to allow for road surface irregularities.

The fabric covering is waterproofed and is buttoned to the metal framework with snap fasteners to insure a taut surface. If any part of the car is in need of adjustment the body covering is unbuttoned.

Weighing under 1,000 pounds, the roadster operates economically, averaging about 40 miles per gallon of gasoline. Car goes 60 m.p.h.



Top—Constructed by Nelson Cornelius, Minneepolis, Minn.. this novel auto hes pneumatic springs and febric covered freme-work for body. Lower—Close-up of uncovered welded freme.

Constructs Miniature Castle

Using petrified rocks, bleck onyx, copper ore, and lime-stone gethered from meny western stetes, Joseph Adams, of Omeha, Neb., erected this minieture cestle in his backyard.

USING stones and rocks gathered in ten years of travel through a dozen western states, Joseph Adams, of Omaha, Neb., constructed a miniature of historical Janstien Castle in Czecho-Slovakia, his boyhood home. The tiny castle is ten feet wide and its highest turret stands six and one-half feet.

Adjacent to the model castle, Adams constructed a miniature water power mill which actually saws small logs.

Formula May Net Fortune

CONDUCTING chemical experiments may prove very profitable for William Mahle, 21, and Harold Ohlgren, 23, of Cokato and St. Paul, Minn., respectively. The two boys developed a secret process for manufacturing gasoline from clover while doing research work at Macalester College in St. Paul.

Several foreign governments are said to be interested in the boys' experiments, and it is claimed that they have already refused offers of substantial amounts for their unusual formula. American corporations are also expressing interest in the process.

Experimenting et Mecelester College in St. Paul, Minn., William Mahle (left) and Harold Ohlgren discovered a process for making gasoline from clover. Formula mey net fortune.

HE WANTED TO

At the age of 12, Miller Reese Hutchison announced his ambition to aid the Wizard, and did—but before that he won many laurels by his inventive genius.

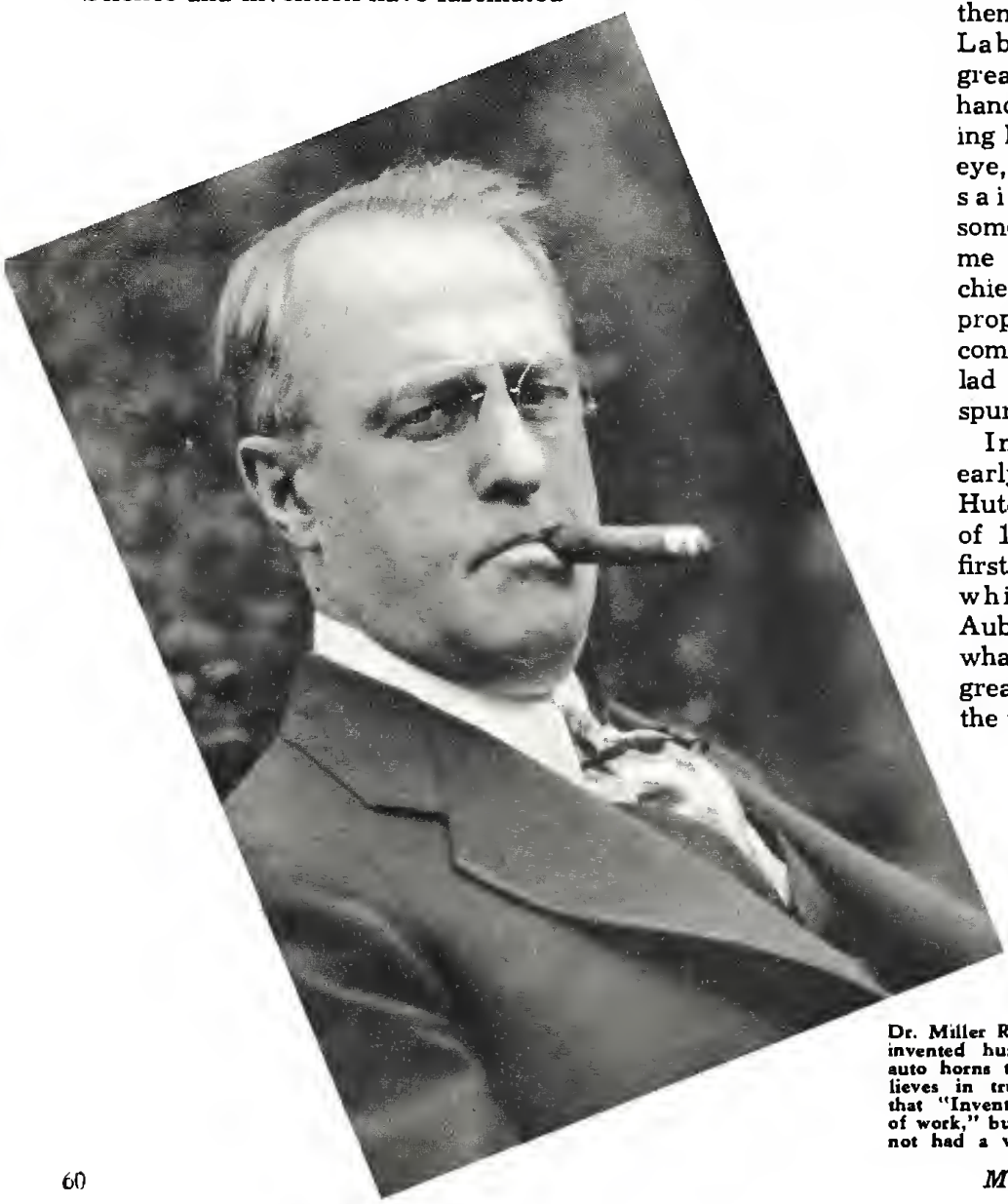
by Aubrey D. McFadyen

DR. MILLER REESE HUTCHISON is an extraordinary combination of inventor, engineer, manufacturer, business executive and financier. Born and educated in Alabama, he was one of the first students to be graduated from the Alabama Polytechnic Institute with the degree of Electrical Engineer.

Science and invention have fascinated Dr. Hutchison since childhood. Edison was ever his hero. As a child he devoured every printed page he could get about the great man. One day, when only 12 years old, he confided to his father: "Some day I am going to be Mr. Edison's engineer, so I must study and work to get ready for the position."

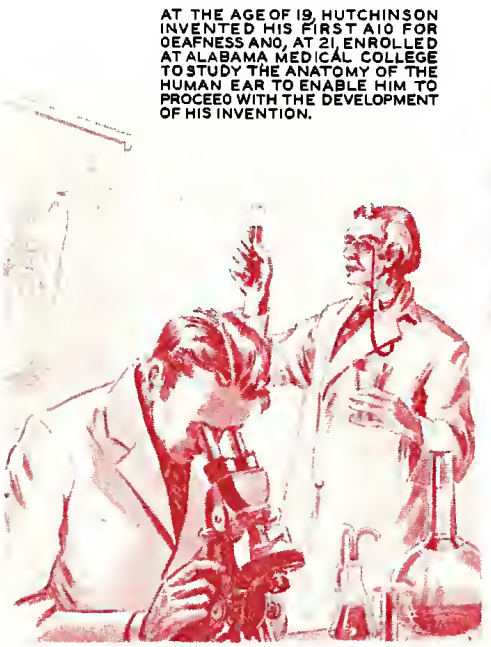
Upon completing his college course the lad accompanied his father on an extensive tour of the industrial centers. Their travels took them to the Edison Laboratories. The great man shook hands with him. Looking him straight in the eye, young Hutchison said: "Mr. Edison, some day you will ask me to become your chief engineer." That prophecy was later to come true, but first the lad had to win his spurs.

Inventing began early with Miller Reese Hutchison. At the age of 15 he patented his first invention. At 19, while a student at Auburn, he conceived what he considers his greatest invention—the first of his series of



Dr. Miller Reese Hutchison, who has invented hundreds of devices from auto horns to aids for the deaf, believes in truth of Edison's remark that "Inventing is the hardest kind of work," but likes it so much he has not had a vacation in twenty years.

WORK FOR EDISON



AT THE AGE OF 19, HUTCHINSON INVENTED HIS FIRST AID FOR DEAFNESS AND, AT 21, ENROLLED AT ALABAMA MEDICAL COLLEGE TO STUDY THE ANATOMY OF THE HUMAN EAR TO ENABLE HIM TO PROCEED WITH THE DEVELOPMENT OF HIS INVENTION.

SUMMONED TO THE COURT OF ST. JAMES, HE EARNED A MEDAL FOR ATTENDING HER MAJESTY QUEEN ALEXANDRA AND WAS A GUEST AT THE CORONATION OF THE QUEEN AND KING EDWARD THE VII.

15,000,000 AUTOISTS USED HUTCHINSON'S KLAXON HORN. MARK TWAIN JESTINGLY ACCUSED HIM OF INVENTING IT TO MAKE PEOPLE DEAF SO THEY WOULD HAVE TO BUY HIS ACCOUSTICON. THE HORN EARNED A FORTUNE FOR THE INVENTOR.

AS A BOY, HUTCHINSON PLANNED TO BECOME THE CHIEF ENGINEER FOR THOMAS A. EDISON —AFTER TWO YEARS IN THE LABORATORIES, HE REALIZED HIS AMBITION IN 1912. LATER HE BECAME THE PERSONAL ENGINEERING ADVISOR TO EDISON AND WORKED TIRELESSLY.

electrical devices designed to enable the deaf to hear. At 21 young Hutchison enrolled at the Alabama Medical College—to study the anatomy of the human ear for the avowed purpose that he might intelligently and safely proceed with the development of this invention. Many difficulties were to be encountered by the young inventor before realizing his vision. His ultimate success, however, may be attested to by grateful people throughout the world who hear today through aid of the electric devices invented by Hutchison.

At the age of 26 Hutchison was requested to appear at the Court of St. James to attend

[*Continued on page* 118]

PRESIDENT WILSON NAMED THE INVENTOR TO THE NAVAL CONSULTING BOARD DURING THE WORLD WAR. HUTCHINSON DROPPED ALL COMMERCIAL ACTIVITY TO SERVE THE GOVERNMENT AS A DOLLAR-A-YEAR WORKER.

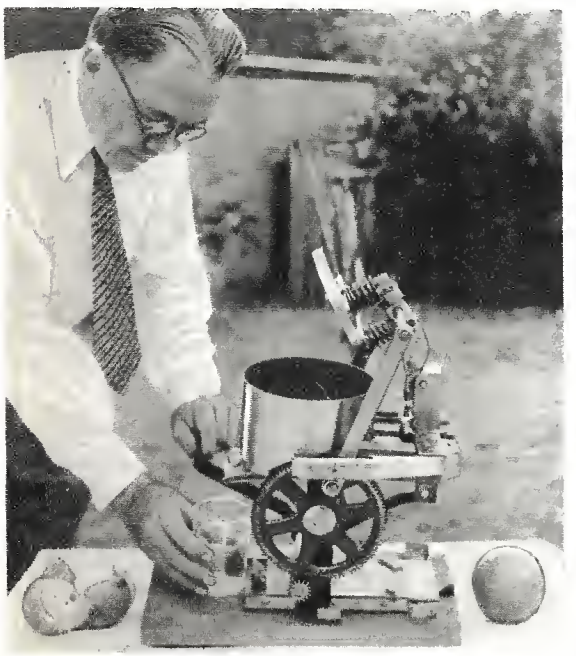
Winter Storm Pounds And Breaks Steamer In Half

Pounded by heevy winter sees, the Americen steemer Bessemer City was wrecked at St. Ives, Cornwall, Englend. A few hours eftet the crew esceped combers ripped the vessel in two.

AN UNUSUALLY heavy toll was taken on the icy seas this winter when storms buffeted even the greatest liners, jarring and bruising their passengers, and sinking many small ships. One of the most unusual wrecks was that of the steamer Bessemer City, out of New York, which foundered in a gale off the rugged coast of Cornwall, England. During the night the vessel was tossed high on the rocks outside St. Ives. Just before dawn the crew abandoned ship. A few hours later the big waves ripped the steamer in two.

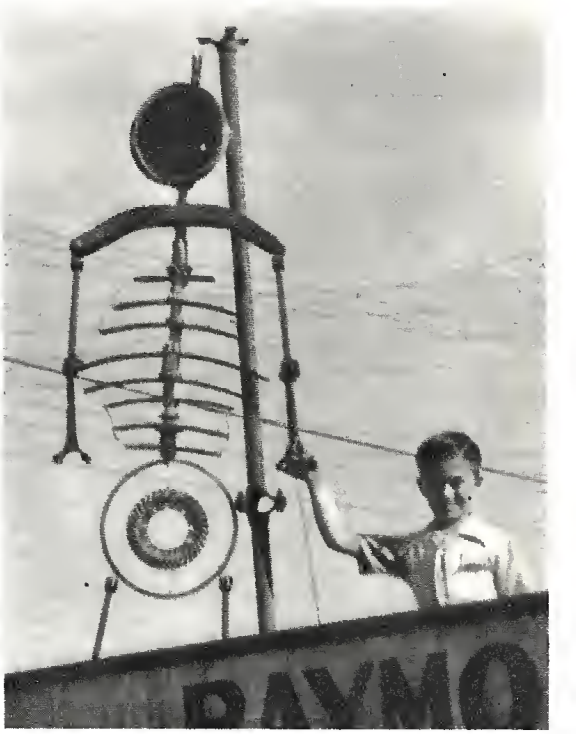
Juicer Eliminates Acid

ORANGE juice which does not contain oil, or citric acid, from the peel has now been made available by F. L. McCulloch, an inventor of Tampa, Fla., whose new orange squeezer, which works either by hand or motor, presses the whole fruit at one operation. The citric acid is caught in a small groove and drained off.



F. L. McCulloch, Tempa, Fla., inventor, demonstretes his orenge juicer which squeezes the whole fruit under a 50-lb. pressure, end seperates citric ecid in peel from the pure juice.

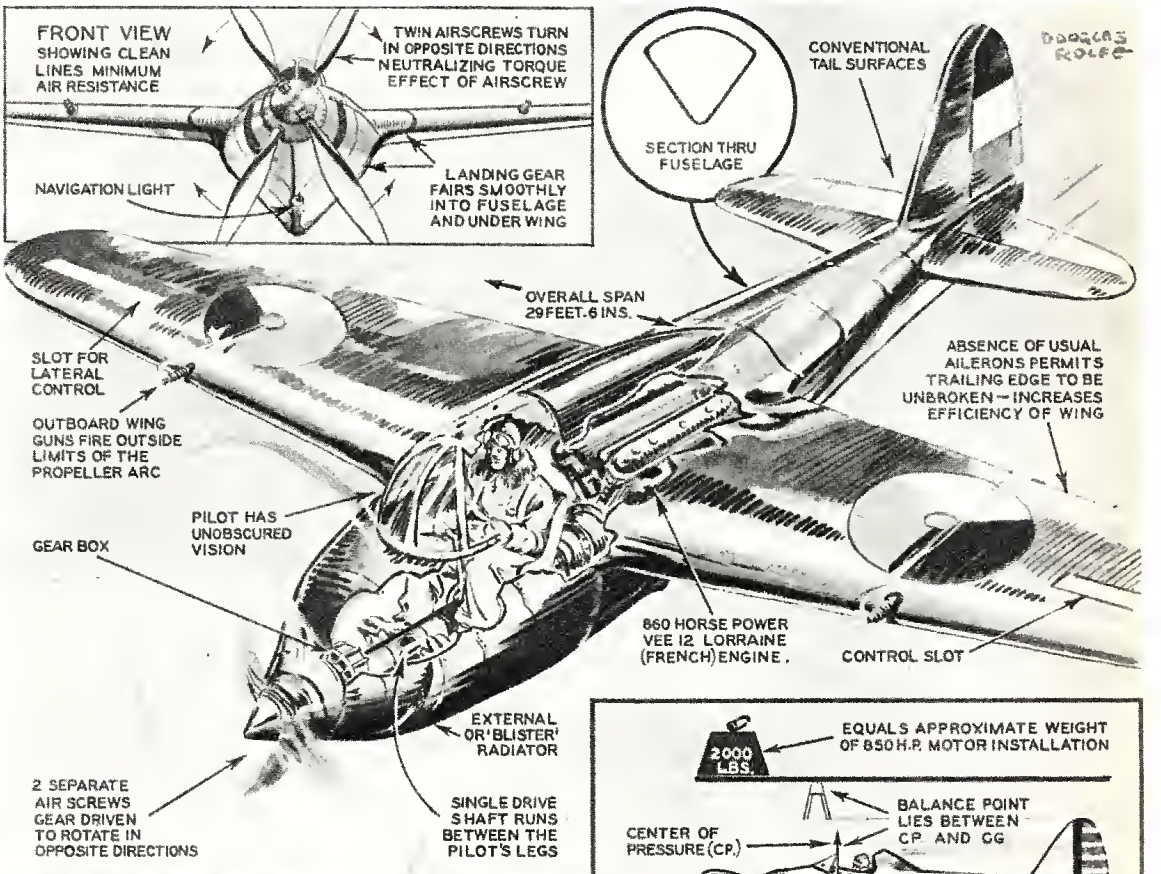
Skeleton From Auto Parts

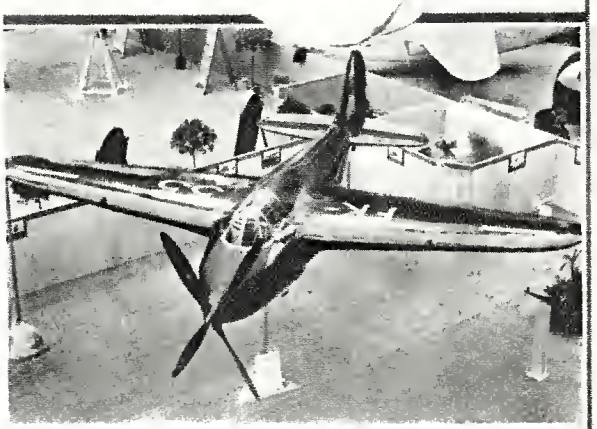


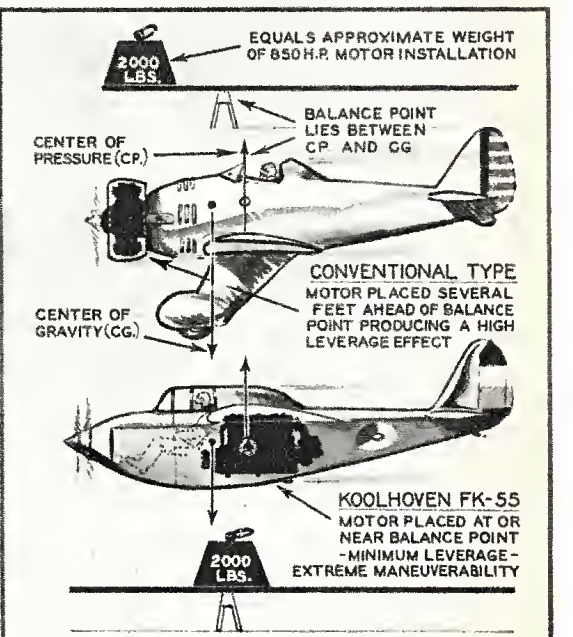
The composite "ghost" of meny a long deed euto forms this unique edvertising displey et e Tempe, Fle., euto lot. The "skull" is e headlight, the "ribs" leaves of springs.

UTILIZING odd parts of old autos, a Tampa, Fla., firm dealing in used auto parts constructed a skeleton from a headlight, spring leaves, connecting rods, ring gears, pinions and starting gears. The unique "ghost" of many a long departed car, instead of scaring people away, attracted them, and many who came to laugh stayed to buy.

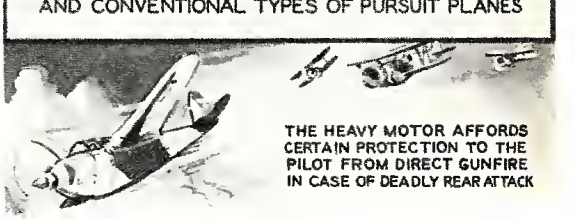
War Plane Has Motor Amidship


FRONT VIEW
SHOWING CLEAN LINES MINIMUM AIR RESISTANCE
TWIN AIRSCREWS TURN IN OPPOSITE DIRECTIONS NEUTRALIZING TORQUE EFFECT OF AIRSCREW
NAVIGATION LIGHT
LANDING GEAR FAIRS SMOOTHLY INTO FUSELAGE AND UNDER WING
SECTION THRU FUSELAGE
CONVENTIONAL TAIL SURFACES
OVERALL SPAN 29 FEET-6 INS.
SLOT FOR LATERAL CONTROL
OUTBOARD WING GUNS FIRE OUTSIDE LIMITS OF THE PROPELLER ARC
ABSENCE OF USUAL AILERONS PERMITS TRAILING EDGE TO BE UNBROKEN — INCREASES EFFICIENCY OF WING
PILOT HAS UNOBSCURED VISION
GEAR BOX
860 HORSE POWER VEE 12 LORRAINE (FRENCH) ENGINE.
CONTROL SLOT
EXTERNAL OR 'BLISTER' RADIATOR
2 SEPARATE AIR SCREWS GEAR DRIVEN TO ROTATE IN OPPOSITE DIRECTIONS
SINGLE DRIVE SHAFT RUNS BETWEEN THE PILOT'S LEGS




2000 LBS.
EQUALS APPROXIMATE WEIGHT OF 850 H.P. MOTOR INSTALLATION
BALANCE POINT LIES BETWEEN CP AND CG
CENTER OF PRESSURE (CP.)
CONVENTIONAL TYPE
MOTOR PLACED SEVERAL FEET AHEAD OF BALANCE POINT PRODUCING A HIGH LEVERAGE EFFECT
CENTER OF GRAVITY (CG.)
KOOLHOVEN FK-55
MOTOR PLACED AT OR NEAR BALANCE POINT -MINIMUM LEVERAGE- EXTREME MANEUVERABILITY
2000 LBS.

A SIMPLE ILLUSTRATION CONTRASTING THE DISTRIBUTION OF MASS WEIGHTS ON NEWEST AND CONVENTIONAL TYPES OF PURSUIT PLANES



THE HEAVY MOTOR AFFORDS CERTAIN PROTECTION TO THE PILOT FROM DIRECT GUNFIRE IN CASE OF DEADLY REAR ATTACK

HAILED by aviation experts as the greatest single exhibit at the Paris Aero Show, the new Koolhoven F. K. 55 single-seat fighting plane may change present standards of military aircraft design.

The Koolhoven utilizes a twin propeller drive similar to that used by the Italian Macchi-Fiat seaplane—holder of the world's aircraft speed record. The outstanding innovation of the Koolhoven fighter, however, is the placing of the powerful 860 h. p. motor amidships instead of at the nose as is customary. This materially changes the plane's balance, making it more maneuverable. The dual propellers, driven by a single engine but rotating in opposite directions, eliminates torque (twisting of plane around longitudinal axis) making plane easier and smoother to handle. Conventional aileron controls are dispensed with in the Koolhoven, small wing slots taking their place.

GIRL

Clara C. Reger, who was introduced to amateur radio when her brother discovered he could get more answers to his calls with a girl's voice in the station. However, she prefers code work.

WHEN you dial your home radio to the amateur phone bands to listen in on the "hams," it is not unlikely that you may hear a girl chatting with an unseen friend in some far corner of the world. This feminine ham is one of the 400 or so YL's or XYL's brave and bright enough to have invaded the air realm ruled by more than 60,000 licensed men and boys around the globe.

The YL's and XYL's—abbreviations in the universal code language of the amateur denoting "young ladies" and "ex-young ladies," or wives—are highly proficient and well-known operators. Some can—and do—beat the men at their own game, whether it is traffic handling, DX (international long distance work), or just plain "rag chewing."

YL's and XYL's are located in various parts of the world and come from as many diversified walks of life as their radio brothers in the great fraternity of the air. One YL in Poland is a beautiful movie actress. An active XYL in Australia is the mother of two YL's. There are about 70 feminine hams outside the United States in such widely separated countries as Great Britain, Czechoslovakia, Finland, France, Ecuador. Portugal, Roumania, Canada, New Zealand. Cuba, Mexico and Brazil.

Every feminine ham has passed rigid examinations on technical knowledge and operating skill and is thoroughly qualified to handle her transmitter and receiver. In the United States, Alaska and Hawaii some 350

Left—Elizabeth M. Zandonini, of W3CDQ, Washington, one of hamdom's most erudite YL's. Right—Nellie Corry of England, who tapped world on a 10-meter home-made set.

HAMS

by Clinton De Soto

Mrs. Esther McClara of Alameda, Calif., receives a Pacific Division Radio Relay League message from Horace Greer. Mrs. McClara is pioneer feminine ham on the Coast.

women each possess an operator's license as well as a station license issued by the Federal Communications Commission.

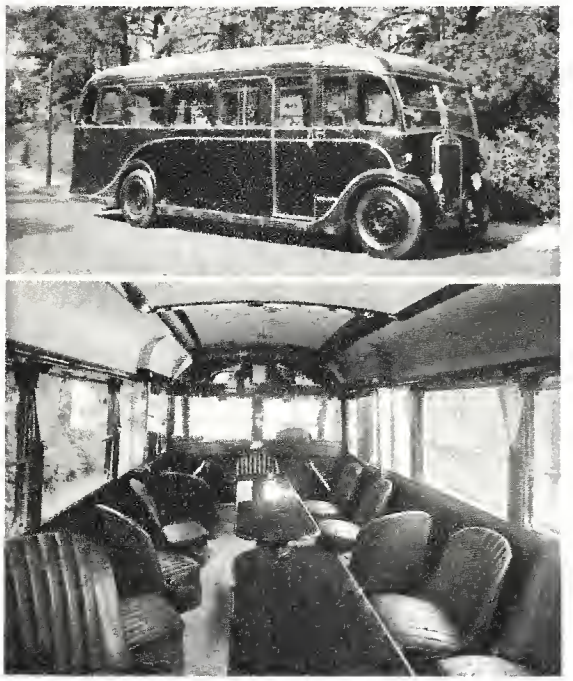
Among these maidens of the magic microphone and key are many who have made an enviable name in a difficult game. One of the most scientifically erudite of the YL's is Elizabeth M. Zandonini, W3CDQ, of Washington, D. C. She is radio aide at the National Bureau of Standards, where her work includes maintaining the primary frequency standard, preparing engineering reference lists, translations of foreign technical material and various public contact jobs. As assistant director of the American Radio Relay League, "EMZ" made two trips abroad in cementing ham friendships begun and maintained over the air.

Mrs. Esther McClara, W6ALH, of Alameda, is one of the most popular figures in California hamdom. She is one of the first feminine operators licensed on the Pacific Coast. A number of feminine hams have entered radio work quite accidentally. One is Clara C. Reger, W8KYR, Buffalo, N. Y., who was introduced to amateur radio in 1933 when her brother, W8AOM, operating a 4-megacycle phone

[*Continued on page* 124]

Members of the world's prize radio family are these three sisters in New Zealand. At the left is Kathleen Kirby, ZL4DT; at the right is Nancy Kirby, ZL4FN. In the center is Mrs. Peggy Cameron, ZL4CL, whose husband inspired interest of entire family, including a younger brother, in radio.

City Officials Travel In Mobile Board Room



Top—This coach constitutes a mobile board room used by civic officials of Birmingham, Englend. Lower—Interior view showing swivel chairs, tables, and lighting arrengement.

THROUGH the use of a mobile board room, the aldermen and councilors of Birmingham, England, have cut down traveling expenses and have more time to devote to needed conferences. The board room consists of a specially built motor coach.

The use of the novel motor coach has eliminated the need for a fleet of autos to carry officials to municipal properties scattered over a wide area. The room is fitted with comfortable swivel chairs, tables and electric lights, making it possible to carry on committee work while the coach is in motion. A phone connects driver and passengers.

Builds 12-Foot Ship Model

IN AN effort to arouse public interest and secure financial support for the building of a sea-going gospel ship to replace a vessel destroyed by fire, L. Beavis, of Silverdale, New Zealand, constructed a 12-foot model of a barkentine sailing ship.

The *Israel,* as the model was named, was wheeled along the highway between Auckland and Wellington on a special carrier. Sails were set and wind power used whenever possible.

This barkentine sailing ship model was built by L. Beavis, of Silverdale, New Zealand. It served to attract attention and helped him reise funds for building sea-going gospel ship.

Sponsors Knockabout Races

New racing cless for owners of Cape Cod Knockebout sailboats of type shown above has been established. H. L. Williams, of Cepe Cod Shipbuilding Co., Wareham, Mass., is sponsor.

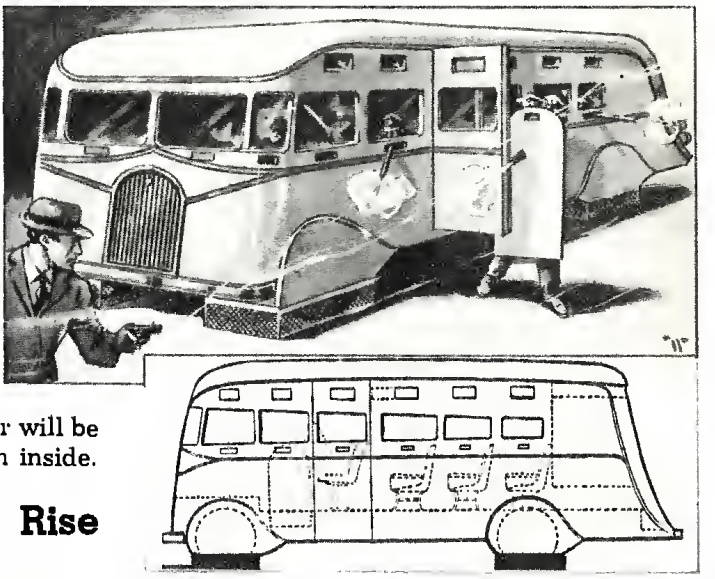
TO INCREASE interest in small sailboat racing, Harvey L. Williams, head of the Cape Cod Shipbuilding Co., Wareham, Mass., will sponsor annual races for Cape Cod Knockabout sailboats, thereby creating another racing class.

Charles Young III, and Alonzo Neal, representing the Pine Orchard (Conn.) Yacht Club, won the first annual race of the new class held at Marion, Mass.

Milwaukee Police Department Develops Auto Fort

A HUGE armored patrol van capable of housing 25 men plus full equipment consisting of revolvers, rifles, machine guns, tear gas bombs, and ammunition is being developed by the police department of Milwaukee, Wis. The mobile fort will be 22 feet, 7 inches long, 9 feet, 8 inches high, and 8 feet wide.

The van will have a body of bullet proof metal and windshield and windows will be shatterproof. A bullet proof mesh shield will protect radiator and wheels, and motor will be shielded so repairs can be made from inside.



Top—Artist's sketch of new armored patrol van being built by Milwaukee, Wis., police department. It will carry 25 men and full equipment of guns and bombs. Bullet proof mesh screens protect tires. Lower—Plan view of $5,000 mobile fort.

Chair Helps Invalids Rise

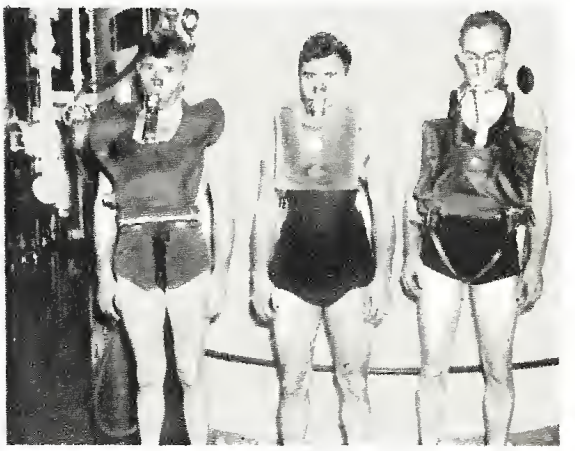
This mechanical chair helps invalids conserve their strength. Pressing a button causes seat to rise at an angle, elevating invalid to standing position. Second button lowers seat.

DESIGNED to conserve the strength of invalids, a new mechanical chair elevates the sitter to a standing position at the pressing of a button. The seat of the chair rises at an angle through the use of a cam operated mechanism enabling the patient to get out of chair and onto crutches without human aid.

Gobs Test Submarine Masks

SIMULATING conditions aboard a disabled and sunken submarine, three U. S. Navy sailors—Melvin Cottroll, Louis Zampligione, and Leslie Jones, conducted tests to determine the relative efficiency of submarine escape masks used by the U. S., German, and British navies.

The masks featured oxygen tanks and were found to be equally effective for use in water and against chlorine fumes generated when salt water comes in contact with a submarine's storage batteries.



Melvin Cottroll (left), Louis Zampligione (center), and Leslie Jones, U. S. sailors, tested German, U. S., and British submarine escape masks to determine their relative efficiency.

THE

The eye of the camera catches the mundane and makes it a thing of beauty. This picture of Terminal Tower in Cleveland is the first skyscraper photo made by Margaret Bourke-White.

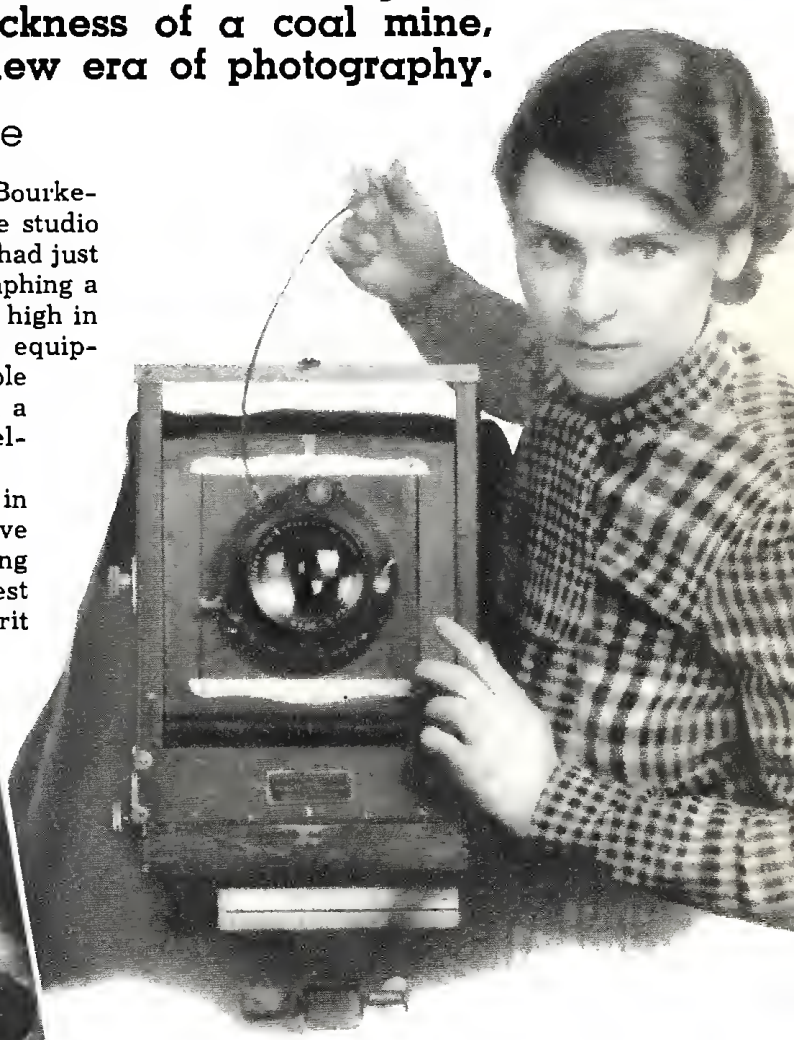
CAMERA QUEEN

Margaret Bourke-White, who saw beauty in the lines of a steel girder and the blackness of a coal mine, pioneers a new era of photography.

by Richard H. Parke

WHEN I called on Margaret Bourke-White in her spacious penthouse studio in a Fifth Avenue office building, she had just returned to New York from photographing a new textile mill in the South. Piled high in the center of the vast room was the equipment she had carried with her: A couple of cameras, a box of flashlight bulbs, a folded tripod and three or four travel-scarred suitcases.

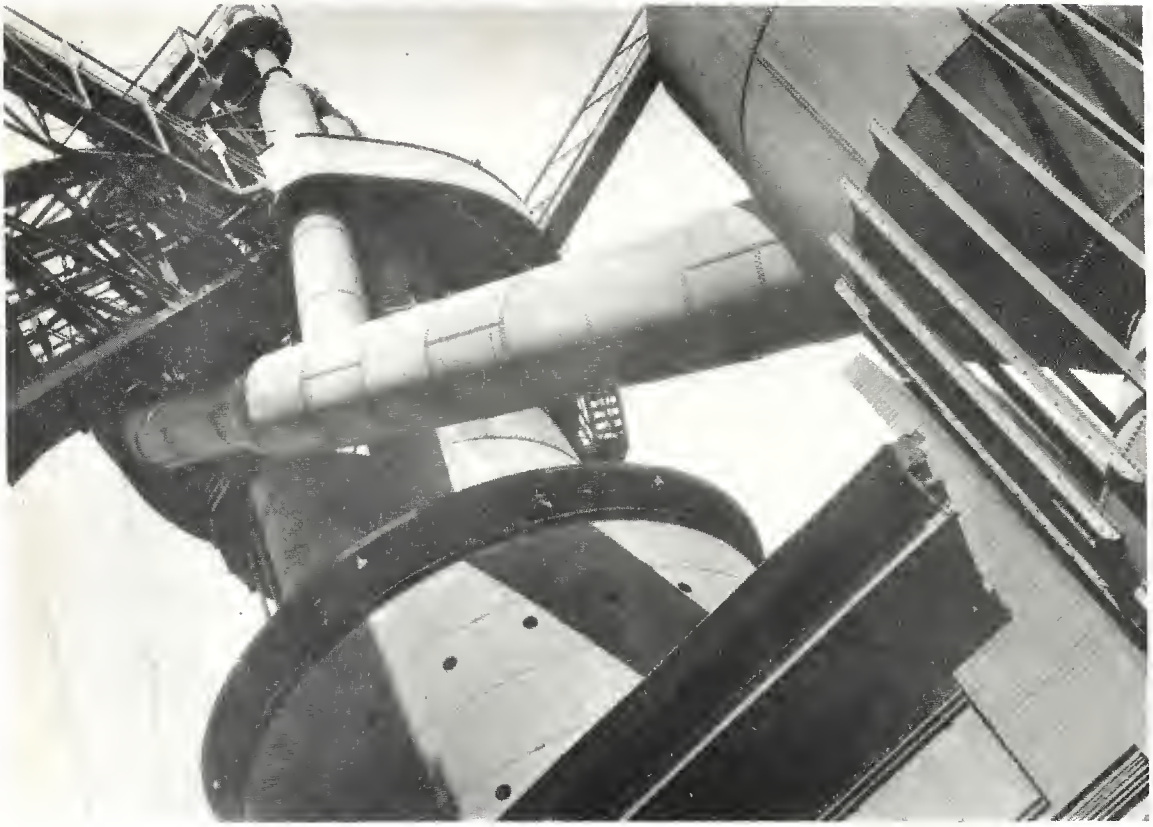
To me, they represented Exhibit A in the fast-accumulating evidence to prove that this dark-eyed, intense young woman is one of the world's greatest photographers. I saw in them the spirit



Margaret Bourke-White, who pioneered in the idea there is beauty in industry. Left—Typical industrial picture showing the magic kettles of science in American Catalin Corporation plant.

of adventure and pioneering which is the secret of her success, the same spirit which led her to go to New York ten years ago and embark on the development of an idea which was peculiarly her own.

Briefly, that idea was that there is beauty in industry—a beauty that lies in the clean-cut lines of a steel girder, the towering majesty of a city skyscraper, the shower of sparks from a blazing coke oven, the sombre blackness of a coal mine. She knew that the



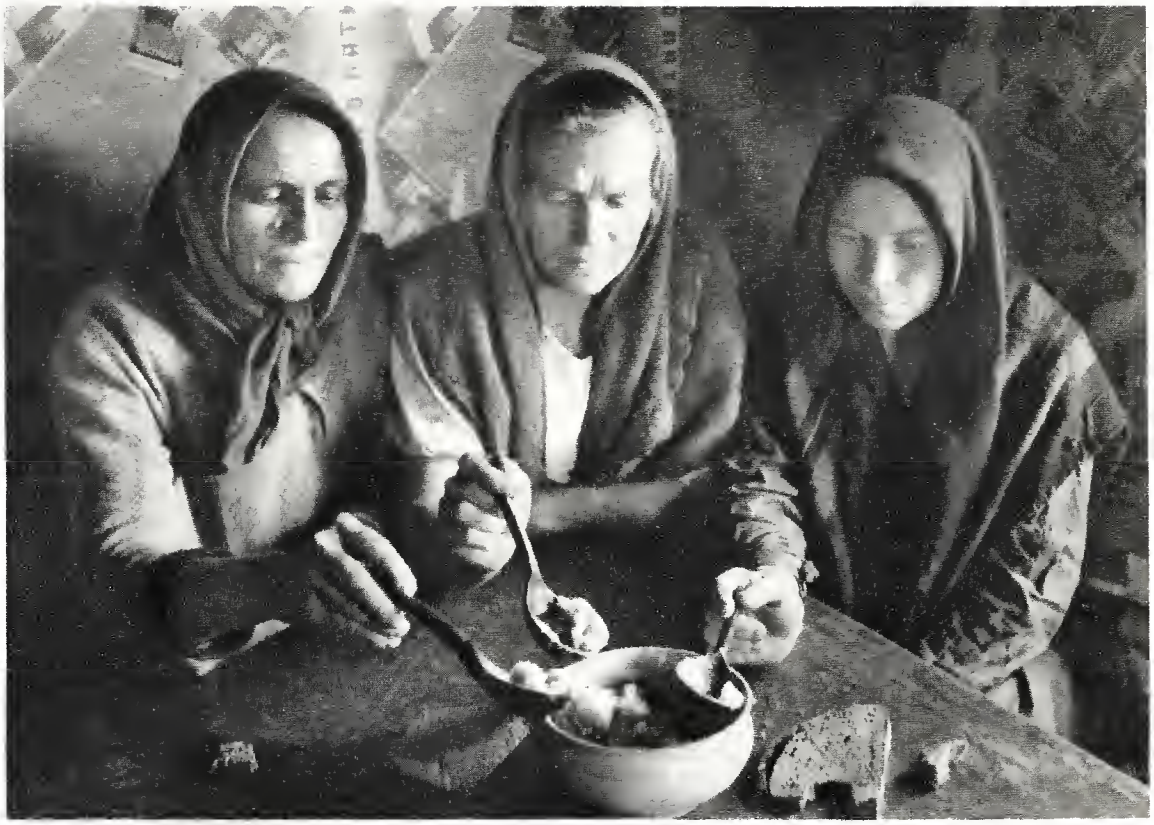
What may appear to the eye as ugly pipes at the Ford Plant at River Rouge, Mich., assumes a strange fascination when pictured by the expert's camera.

faces of factory workers could wear the nobility of statesmen, that farmers could plow their fields with the grace of athletes and that the skill in a workman's toss of a red-hot rivet could be compared with the marksmanship of a rifleman.

It remained only for her to capture these impressions photographically. She did, and the result is that she is now known primarily as an industrial photographer, as the woman who found real art in the mechanistic age and translated it into hundreds upon hundreds of vivid photographs known the world over for their imagination and beauty of design.

She was 22 when she first went to New York City. She had just been graduated from Cornell University in upstate New York, where she had earned part of her tuition by taking pictures of the campus. Her family at that time was living

The Grand Canyon seems to assume even greater grandeur with the magic of Miss Bourke-White's lens aimed from the sky.



Russian women eating potatoes. Miss Bourke-White catches the grimness of their faces in this simple photo as they unconsciously dramatize famine.

What a rubberneck sees in New York—the Empire State Building's graceful lines as it towers 1,248 feet in the air.

in Cleveland, and for a few months after college she took commissions for architectural and garden photographs in that city.

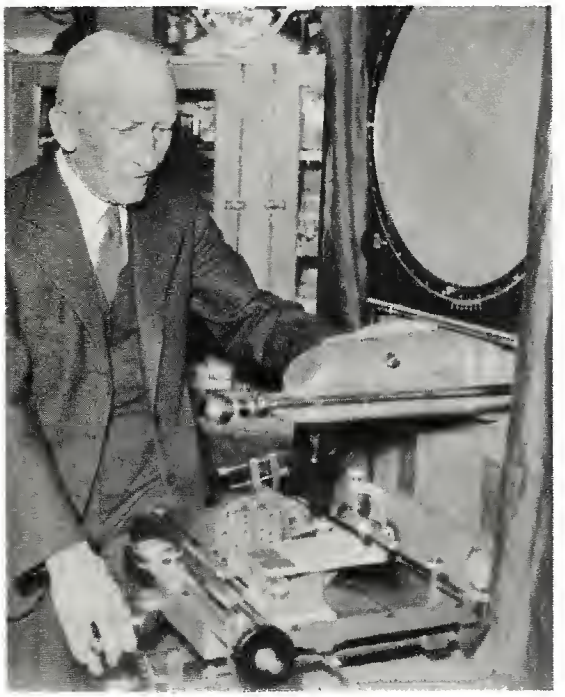
But it was not until a friend one day allowed her to use her camera on his steel mill that she really discovered her forte. She took hundreds of negatives and kept twelve.

"I realized then," she told me, "that I had found out what I wanted to do. I inherited from my father an appreciation of the beauty in stone and steel—in industry itself—all of the things that bring one closer to life. Industrial photography seemed to be the answer to all of this."

She arrived in New York in 1927 with her cameras, a collection of photographs and letters of introduction to a group of well-known architects. One of them was so impressed by her "samples" that he took some of her pictures and told his friends about them. Later a

[*Continued on page* 128]

Dr. Bausch Honored For Microscope Development



For his development of the microscope and other optical science achievements, Dr. Edwerd Bausch, of Rochester, N. Y., has been ewerded a medal by Americen Society of Mechenical Engineers. Active at 83, his letest work is a Contour Meesuring Projector (ebove) for industrial use.

THE American Society of Mechanical Engineers has awarded a medal to Dr. Edward Bausch, of the Bausch & Lomb Optical Co., Rochester, N. Y., for his achievements in the field of optical science. Dr. Bausch is particularly famous for his development of the microscope since he constructed his first one back in 1872.

At 83 years of age, Dr. Bausch is still on the job every day. His latest work is the design of a contour measuring projector, a new instrument of great utility in industry. The device is both a microscope and a projector of great accuracy with which a highly magnified image of screw threads, gears, dies, gauges, and shapers may be profiled upon a screen for study and comparison. The instrument quickly shows the magnitude of error in machine tools and parts.

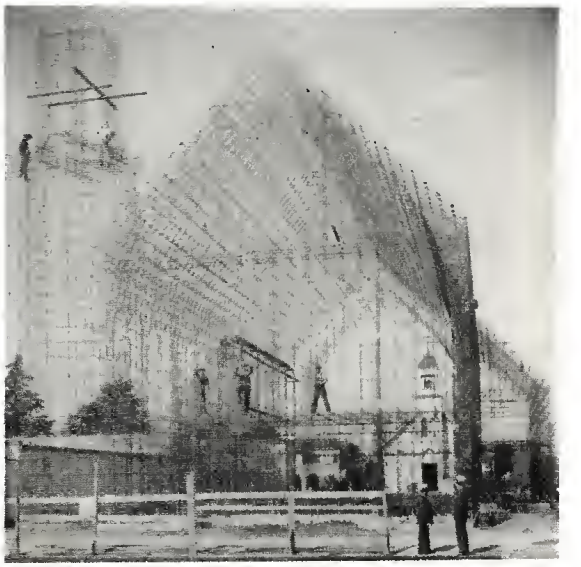
Ford V-8 Travels On Rails

TRANSPORTATION is a problem in the hills north of Nome, Alaska, due to lack of roads. A narrow gauge track runs through the district, however, and an original Ford V-8 unit has been converted into a vehicle which can speed deliveries over the tracks.

Two four-wheel trucks replace the front and rear axle assemblies and the rear drive is connected by a propeller shaft to the standard Ford truck transmission. The converted auto carries a 5-ton load.

Mounted on four-wheel trucks to travel e nerrow gauge track, this Ford V-8 unit cerries e 5-ton loed end pulls several loaded flat cars over roadless area near Nome, Alaske.

Church Has Rod Framework



St. Augustine's Catholic Church in Culver City, Celif., has e framework made of vertical and horizontal steel rods welded together. It is said to be first structure of its type.

DESIGNED to be resistant to termites, fire and earthquakes, St. Augustine's Catholic Church being erected in Culver City, Calif., is the first structure ever to be built with an entire framework, walls, roof and floor joists constructed of steel rods.

Under a patent issued to A. M. McClellan, all joints are made by wrapping vertical steel rod members around horizontal members and arc welding them. Frame work was fabricated by State Steel Products Co., Los Angeles.

Robot Calculator Solves Algebraic Equations

THE simultaneous calculator, a machine developed at Massachusetts Institute of Technology in Boston by Dr. John B. Wilbur, of the department of civil engineering, and Dr. Vannevar Bush, dean of engineering, can solve nine simultaneous linear algebraic equations to nine or more unknowns in one single action, a mathematical process requiring hours or days by ordinary methods.

The equations solved by the machine occur constantly in engineering and scientific analyses, thus the machine is of practical value. The calculator has over 13,000 separate parts, including 600 feet of flexible steel tape and 1,000 ball-bearing pulleys. The machine is the result of three years of research.

Dr. John B. Wilbur edjusts the simultaneous calculator thet he and Dr. Vannevar Bush deve'oped at Massachusetts Institute of Technology. Device solves linear algebraic equetions in a few seconds, a job usually requiring hours or deys.

Tent Fastens To Auto Top

Crawling pests will not annoy the user of this new auto top tent exhibited at euto show in Paris, France. It can be attached without piercing holes in car roof. (Meurisse Photo)

A NOVEL camp bed-tent that can be attached to an auto roof without piercing holes in the roof has been exhibited in Paris, France. The tent consists of an aluminum tubing frame covered with water-proof canvas, and a pneumatic mattresses for flooring. Frame can be removed or set up in a few minutes time.

Auto Fan Has Rubber Blades

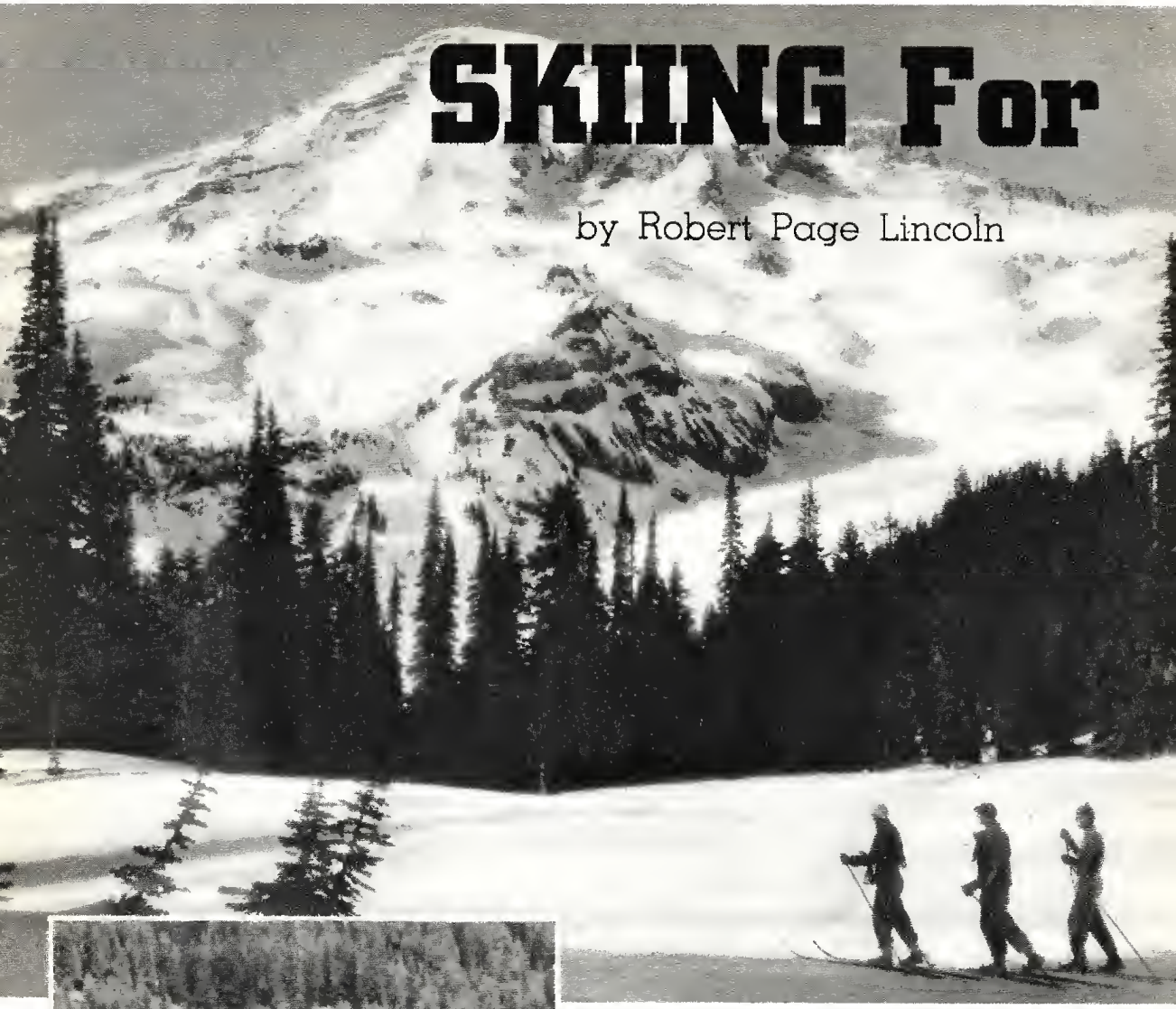
A NEW automobile windshield fan developed by a Rochester, N. Y., manufacturer, has blades of tough, moulded rubber. Though rigid enough for efficient handling of air, the blades are sufficiently soft to prevent injury to even a child's finger.

Powered by a sturdy motor, the 6-volt electric fan is noiseless in operation. Easily installed, the fan is said to be of great aid in defrosting windshields.

Moulded rubber blades of this auto fan effectively churn air but are harmless to human fingers if struck. Fan is noiseless and will defrost windshield in winter, cool car in summer.

SKIING For

by Robert Page Lincoln



Skiers find Rainier National Park, Washington, ideal for thrilling sport. Left—The tiniest edition of the ski girls at Davos, Switzerland. Youngsters learn easily and make good skiers.

LONGER winters and lots more snow is the hope these days of ski-conscious Americans across the nation, from steam-heated New York penthouses to Spanish bungalows in California.

Snow trains chuff out of New York, Boston, Philadelphia and Washington every week-end for the snowlands of New England, upstate New York, the Poconos and Blue Ridge Mountains. Other trains, with instructors aboard, go out of Chicago, Detroit and San Francisco. The Boston and Maine Railroad originated the idea in 1931 when it gave city radiator-huddlers a chance to play with King Winter, and the plan has become nation-wide. Hundreds who used to go South are now staying in the North and finding much more fun, putting swimming and sailboating back on the summer calendar.

Modern Mechanix

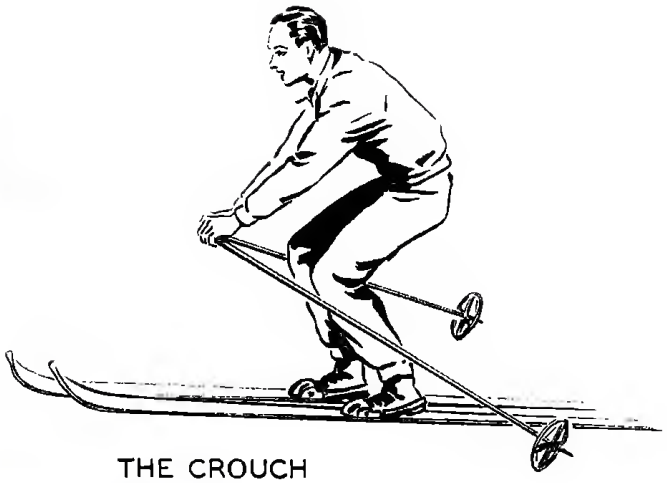
BEGINNERS

Two skiers rest in the sun in Lower Engadine, Switzerland. Right—Skiers enjoy a respite from activities at Davos, popular resort on Swiss Railroads.

Swiss Information Bureau Photos

Ski fans, many of whom learned the art on the borax "snow slides" of many a department store basement, this winter were treated to a snow show in New York's Madison Square Garden. The show, an experiment which started as a dubious undertaking in a week when things were dull around the big indoor arena, literally swept ski-conscious Gotham off its feet onto 500 tons of finely chopped ice. The S. R. O. sign was out every night, and it was with regret the management hauled the snow away to make room for a previously scheduled prosaic event.

Among the features was a ski-jumping exhibition by the foremost exponents of the sport from the United States, Canada, Austria, Norway and Sweden. Crouching from a platform soaring 85 feet up under the rafters, the jumpers slipped down the inrun and leaped through the air, ending in a breath-taking finale on a landing hill. Among the stars of the long hickory slats was Svere Kolterud, sent to the show by the Norwegian

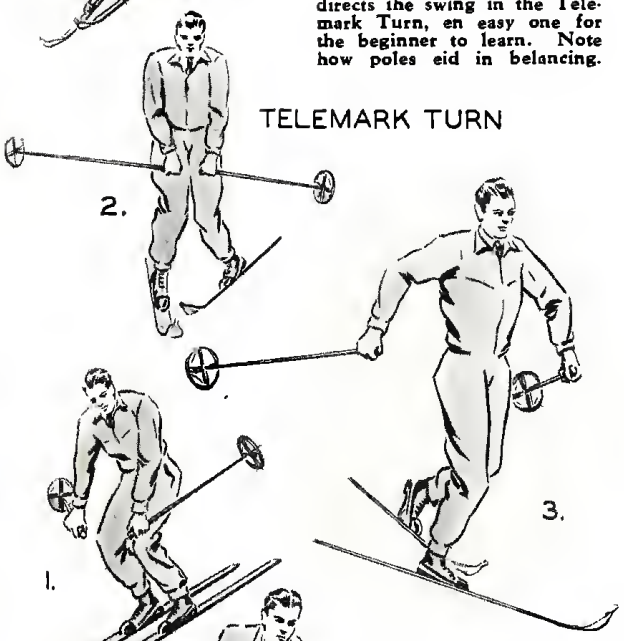


THE CROUCH

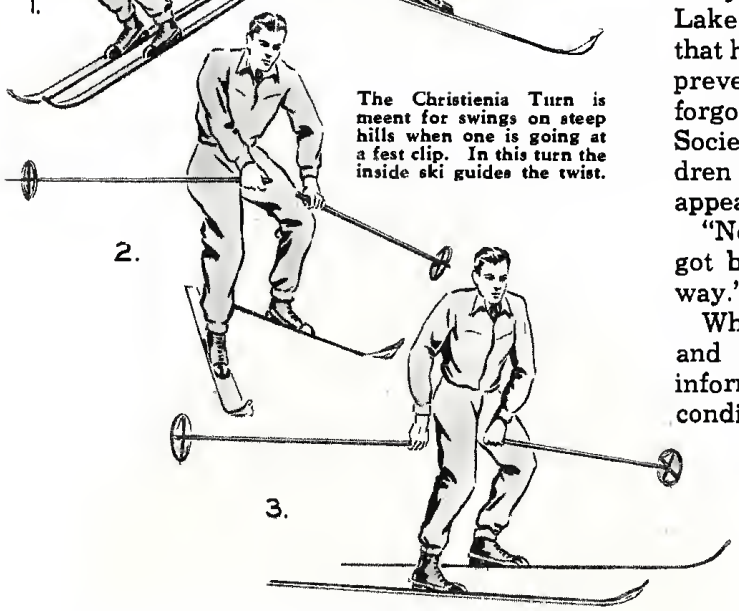
In meneuvering steep hills the crouch position prevents dangerous spills. Meny a novice has started down stending erect—then given up skiing entirely!

The outside ski guides and directs the swing in the Telemark Turn, en easy one for the beginner to learn. Note how poles eid in belancing.

TELEMARK TURN



The Christienia Turn is meent for swings on steep hills when one is going at a fest clip. In this turn the inside ski guides the twist.



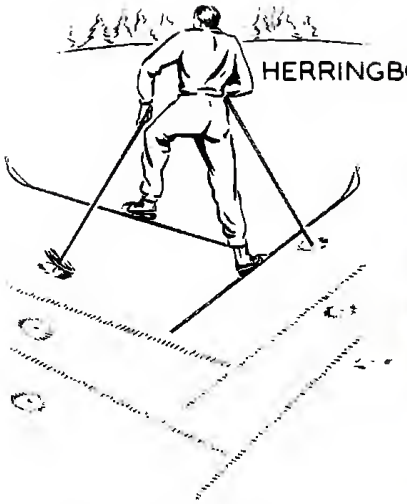
CHRISTIANIA TURN

government, who thrilled the throngs with daring forward somersaults. *Skimeister* Hans Schneider, of Austria, who developed the Arlberg, or crouch, style of skiing, conducted a "clinic" for novices. With the help of Otto Lang and Benno Rybiczka, of St. Anton, in the Tyrol, they went down the steep slope at slow motion, a feat almost unbelievable after Charley Proctor, Sid Buchmayr and Norwood Cox had come down at speeds that seemed almost impossible to check. Schneider is internationally famous as a ski instructor, many kings and ex-kings and most of the royalty of Europe being among his pupils, who average 3,000 a year.

Among the girls who performed at the show were Helen Broughton-Leigh, captain of the U. S. Olympic team, Faith Donaldson and Mary Bird. Peggy Garren, three-year-old Lake Placid tot, planned to tackle the slide that had defeated some of the experts, but was prevented at the last moment. Somebody had forgotten to get little Peggy a permit, and the Society for the Prevention of Cruelty to Children invoked the law prohibiting minors from appearing in stage performances.

"Never mind," Peggy remarked, "they've got bigger and better slides at Placid, anyway."

While ski enthusiasts of the East, Mid-west and Far West are provided with daily information in the newspapers about snow conditions—an item as important to them as world news this winter—thousands of dollars are being expended to improve the nation's ski trails. The Union Pacific Railroad is developing Sun Valley, near the town of Ketchum, Idaho, as a national ski

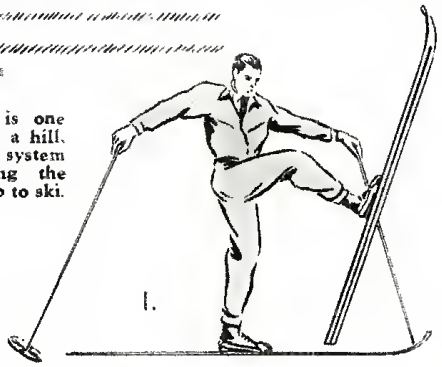


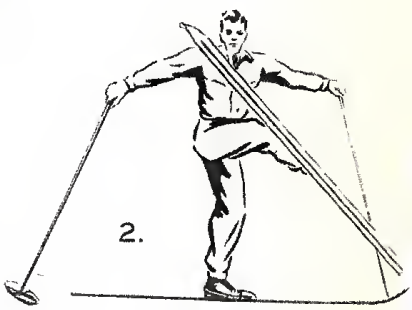
The Herringbone Step is the most efficient and quickest way to get back up the slope for another glide.

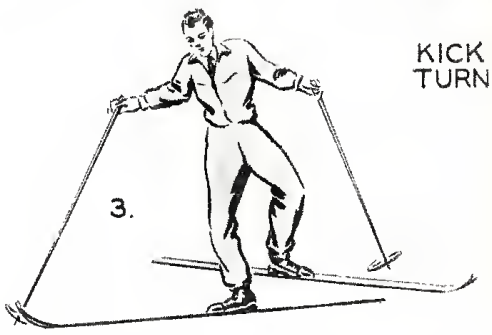
A ski pole, drawn to show both the top and bottom. It should be long enough to reach the chest. Note strap that goes around wrist.

Side-stepping is one way to get up a hill, and is a good system for descending the slope too steep to ski.

The flank jump is a modified side-step, but it requires an expert to do it. Notice how the ski poles help to push the skier along in the climb.







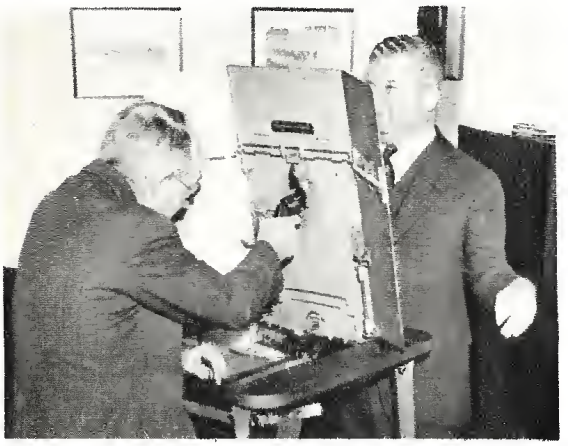
The kick-turn is another favored method of climbing a hill, making the grade in a zig-zag fashion. Simple, but it is not very efficient.

center to vie with those of Europe. The government has spent $300,000 developing a winter playground near Gilford, New Hampshire. Meanwhile, skiers who must have their Alps and the swank that goes with them, last month were carried across the ocean to favorite spots on the Continent aboard three "snow boats," luxury liners with ski slides on deck for mid-sea practice.

Skiing, known to many lands of antiquity,

[*Continued on page* 130]

Steel Counter Devised To Protect Bank Tellers



Charles E. Fyfe, inventor (left), demonstrates his bank teller's protective device to George F. Benhem. Pressure of knee causes steel counter to flip up, ejecting tear gas shell at robbers. Slit in shield enables bank teller to aim gun as well.

BANK holdups should decrease through the use of a new protective device invented by Charles E. Fyfe, of Cedarhurst, N. Y. The device not only helps prevent holdups, but may result in the capture of the robber as well.

The mechanism of the Fer-Ret, as the apparatus is called, flips up the steel counter of the bank teller's window to serve as a protective shield when the teller presses a hidden button with his knee. At the same time, the mechanism automatically ejects a tear gas shell and sounds a loud alarm, summoning police.

Models Aid Student Pilots

PRIMARY instruction of English flying students features the use of model airplanes to explain various flight maneuvers. It is claimed that use of the models has reduced the amount of actual piloting instruction needed to qualify students for a pilot license.

Placing the model in simulated flying positions enables the instructor to graphically illustrate the ground school lectures that are given preparatory to actual flight. After students have started flying, the models are used to illustrate mistakes that occurred during the aerial lessons.

The model airplanes have also proven useful in teaching student pilots the rules governing the relative positions of aircraft using the airways.

Cecil Pashley, veteren pilot-instructor, uses a model airplane to illustrate ground school lessons given to ameteur pilots of the South Coast Flying Club near Brighton, England.

Flashlight Weapon Invented

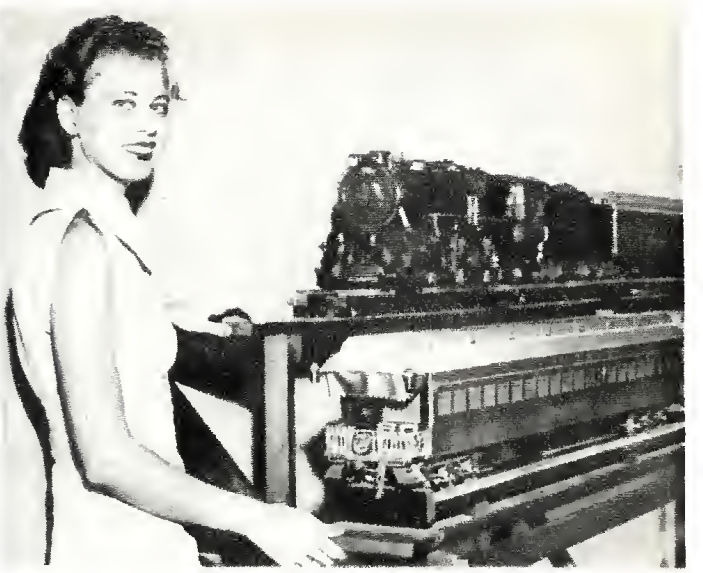
Invented by V. Merifield, Los Angeles policemen, this combination flashlight-gas gun ejects tear gas at pressure of small trigger. Close-up photo shows ejector tube and battery cells.

A COMBINATION flashlight gun has been invented by V. Merifield, of the Los Angeles, Calif., police department. At the pressing of a trigger the device ejects a spray of ammonia or gas from a jet to disable any suspect who might attempt to draw a weapon when the flashlight is aimed.

The novel gun weighs only six ounces, has fewer than a dozen parts, and is practically indestructible. Jet and light are controlled by separate triggers. One filling provides 20 shots of gas.

Model Train Built From Observation

WORKING without blueprints, and relying on his observation only, H. L. Woodson, of St. Louis, Missouri, started work on a model steam locomotive. Three years, one month and four days later it was completed, with steam up. It pulls a train of model passenger cars at a speed of three and one-half miles per hour on eight pounds of steam. An exact replica of the passenger type locomotives of the Pennsylvania system, the model engine is capable of hauling heavy loads up grades.



It required a little more then three yeers for H. L. Woodson of St. Louis, Mo., to completa this model locomotiva, mada by obsarvation only. Powarad by staam, it can heul heevy loeds.

Device Detects Radium

WHEN a valuable tube of radium was lost by the Calgary, British Columbia, hospital, it was suspected that it had gotten into a sewer and given up as lost when electroscopes and other devices failed to trace it. However, a portable radium detector devised by Dr. G. M. Shrum of the University of British Columbia, was rushed to the scene and immediately discovered the precious tube in a sewer far below ground. The instrument consists of batteries and an amplifying apparatus carried in a box fixed to an ordinary pack-rack. Fitted with headphones, the actual detector is an exploring coil carried in a long handle. When radium or radio-active ore is in the vicinity its presence is indicated by a sharp, crackling sound. The closer the coil comes to the ore the louder the "message." The device weighs only 40 pounds.

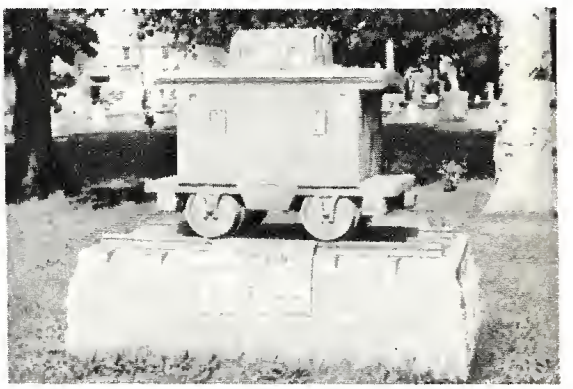
With this portable detector Calgary, B. C., Hospital recoverad velueble redium, lost in sewer.

"Caboose" Is Tombstone

WHEN Charles E. Witting was killed in an accident in the line of duty while working on the Pennsylvania Railroad, on which system he was employed for eight years, an unusual monument was erected to his memory in the graveyard of Urichsville, Ohio, his native town.

Designed after the old-fashioned type of freight caboose, the headstone is mute evidence of the work Witting so much loved. Members of the Urichsville chapter of the Brotherhood of Railroad Trainmen, of which Witting was a member, helped to erect the unique marker.

Witting died at the age of 27 in May, 1900. Since then his tomb has been visited by many, attracted by the strange marker honoring the railroad man.



This unusuel tombstone, representing en old-time freight trein caboose, marks grave of e reilroed men in Urichsville, Ohio.

D'ARTAGNAN

The ancient art of duelling sweeps the country —and it is a sport where women are a match for the men.

None of the Three Musketeers would care to cross swords with this young lady — Helena Mayer, former U. S. women's champion.

The movies have helped sweep fencing in the U. S. to its heights. Here a duel is about to begin in "Romeo and Juliet".

by Maxwell Reid Grant

FIVE THOUSAND masked Americans, sword in hand, are indulging in the thrills of armed combat in a sport as old as history —and today the ancient art of duelling is undergoing an amazing revival. In parlor, attic and gymnasium new devotees by the hundreds are matching wits and blades in America's fastest growing indoor sport. Movie stars, college professors, co-eds, stenographers, laborers, tired business men and athletes are finding relaxation and health in furious battles in which no blood is spilled. no friendships lost.

The day has long passed when no gentleman would walk abroad without a thin-bladed rapier at his side, but the romantic traditions of the court sword are kept alive in the fencing clubs. In Europe fencing has long reigned as the favorite sport of the amateur athlete, and century after century the masters of fencing have been followed with keen enthusiasm. But until lately the sport of fence languished in America, except among a very few devotees.

At the first Olympic games in 1896 Americans were surprised to learn that Europe considered fencing a major sport. It was not until 1912 that the United States sent Americans abroad to compete in Stockholm against the best swordsmen of Europe. Although America failed to win a place, it was the beginning of a real interest in fencing in this country. By 1920 not only the fencing

COMES BACK

clubs but the Army and Navy and many colleges had taken up the sport in earnest. The result was that the United States' team carried off third place that year in the foils team matches at the Olympic Games in Antwerp, being bested only by France and Italy, the two greatest fencing countries on the Continent. Needless to say, Europe was amazed and henceforth America was considered a factor in international fencing. In the 1936 games in Berlin the United States qualified for the semi-finals, lost to Germany and Hungary.

Fencing is no pastime for sissies. Never was the soubriquet "sissy"—as many have termed the sport—more unearned than that for the sport of fence, which actually requires more physical and mental effort than many other major sports, football included.

To the contemptuous complaint of those who say: "What's the use of learning to use a sword? No one wears them now," the enthusiastic fencer asks: "Does anyone carry a bowling ball, boxing gloves, a grand piano, golf clubs or baseball bats around with him all the time?"

The sport has a peculiar thrill all its own. A man can still fight "with his head and heart and supple wrist, still feel the lust of conquest and the hatred of defeat while his blade pulses to the leaping blood that sweeps the master

En Garde! Protecting his head against an oncoming thrust, this fencer is ready to launch out with a cut from his slashing sabre.

Three feminine musketeers. Left to right, Kathleen Hughes-Hellet, Mrs. L. Scott, and Mrs. Johanna de Tuscan, national women's foil champion. Below—Crack men and girl fencers of the University of Southern California, coached by H. J. Uttenhove, famous European swordsman.

Duelling drill as a new film technique. LeRoy Prinz, Hollywood dance director and foils expert coaches Esther Pressman, Beulah McDonald, Bonita Parker, Kay Gordon, Dorothy Thompson and Dene Myles in gracefulness.

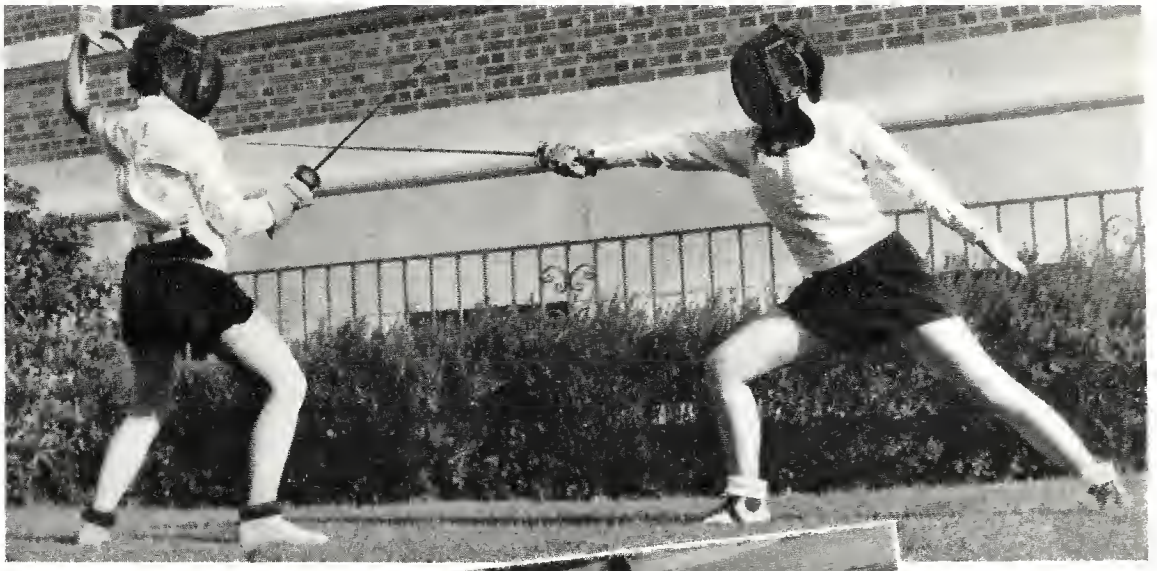
Left—A friendly bout between Olivia de Havilland and Errol Flynn of the movie colony. Above—Robert Grasson, Yale's fencing coach, and his son Maurice (left) pit their skill against Hugo Costello, of New York University, and his father, Julio Costello, N. Y. U. coach

thought of victory across his brain." But between fencers there no longer floats the sinister shadow of the grave; the beating of the wings of death is heard no longer above the clash of steel on steel. Yet for the fencer the rapture of the duel exists.

As a college sport fencing has a great value in that it can be continued after graduation, while basketball, football and other sports may not, to the detriment of the Varsity heroes' physique. Fencing, itself, is a path to quick thinking. It is not regarded as a genteel parlor game, but as a real contest, in which participants can each lose four or five pounds in an hour and a half. The fencer in action is at constant tension. In addition to exerting remarkable physical effort, he must try to outwit his opponent. If he relaxes, defeat will be his. It is a complete training in co-ordination of mind and muscle.

Fencers of 60 or more are found to be erect of bearing and firm of wrist or arm. One English fencer was on the British Olympic fencing team when the modern games were started in Athens in 1896, and competed up through the games in Paris in 1926. Followers of many championship sports have had to give way to the younger men after they have reached a certain age, but in fencing the older men are the acknowledged leaders. An expert fencer can go on almost indefinitely.

But do not think fencing is a sport only for men. Femininity is fast taking up the sword and the female of the species is proving that she is more deadly than the male. Not many blustering swordsmen of old would care to cross blades with Helena Mayer, of Oakland, California, former U. S. woman's champion who represented Germany at the last Olympics in Berlin, and who was defeated



The fencer at the right has just made a lunge, which has been deflected by a parry of "quarte".

Left — Practicing alternate defense and attack under the eyes of an expert. Below—In "guard" position, ready for bout.

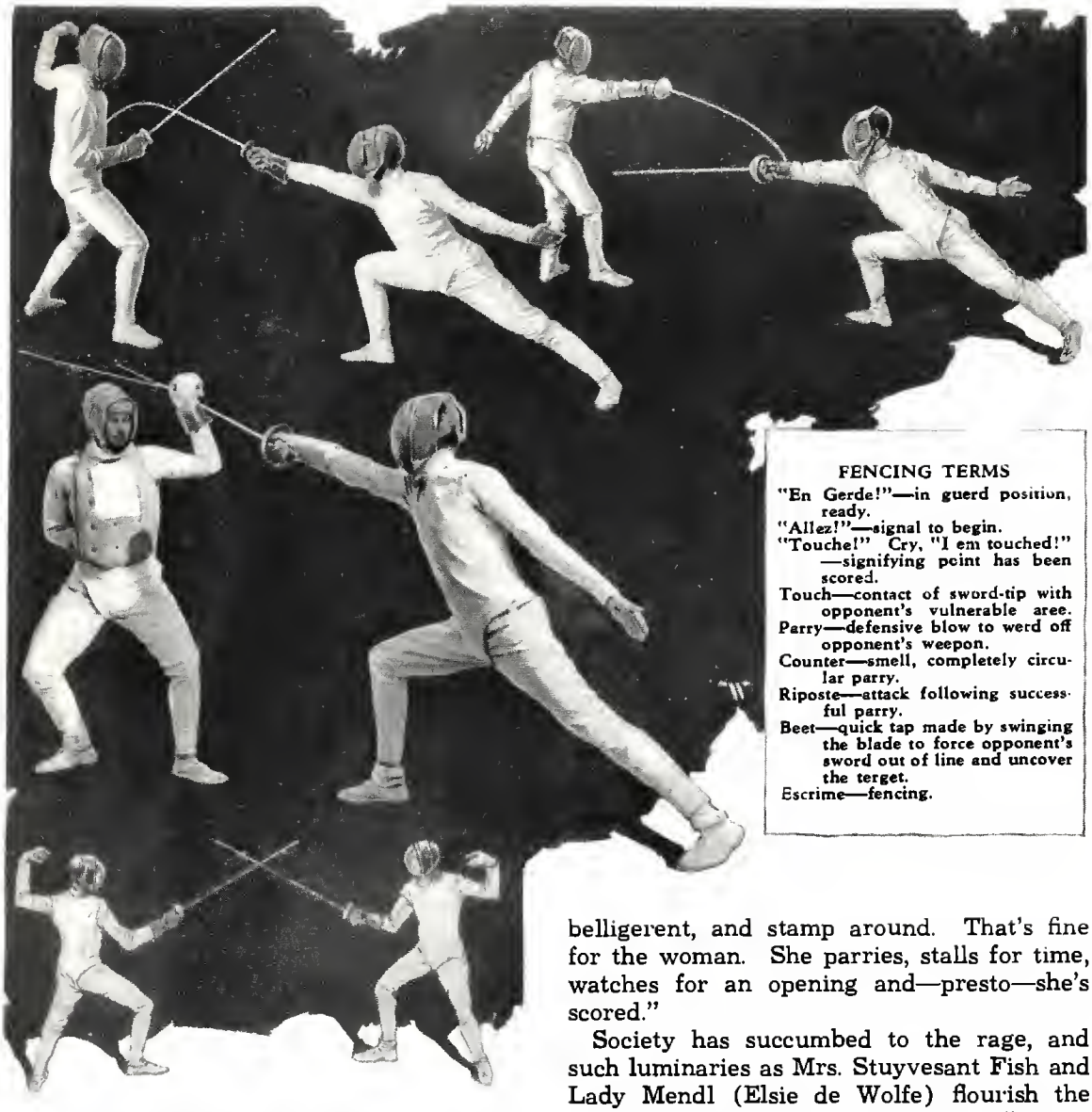
by a petite Hungarian, Miss Schacherer Elek, after Miss Mayer scored five victories and lost only by three points.

Nor would one of the Three Musketeers care much in meeting Mrs. Johanna S. de Tuscan, of Detroit, who now holds the No. 1 ranking in the National Women's Foil Competition. She only took up fencing six years ago, too. Or with Marion Lloyd and Dorothy Locke of New York. Miss Lloyd, twice the national champion, and her Olympic teammate, Miss Locke, have done much to popularize the sport of fence among women of this country and demonstrated that business girls and women have a new and delightful field for play in fencing. Miss Lloyd, a New York Edison Company office employee, heard a man in her office talk of fencing, decided she would like it, and took it up as spare time recreation. She quickly developed into a champion.

In all the Latin European countries women figure prominently in the history of duelling, not only as the cause of most of the encounters on the Field of Honor at dawn, but as participants. Mlle. De Maupin, celebrated French actress, is credited with having fought 80 duels, ten of which were fatal. A few years ago Erzsi Eoryand and Eva Fenyssy, Budapest actresses, broke into world headlines because of a duel they fought over a man. Neither was hurt.

But American women duel for fun—and slender figures. A brisk bout will cause them to lose poundage, and by calling upon deftness, balance and timing, fencing straightens curved backs, trims bumpy ankles and puts a woman's chin up without giving her muscles of a stevedore. It's better than counting ten for temper control. The fencer who can't keep her temper in place hasn't a chance.

Joseph Vince, Hungarian master, who now conducts the Salle d'Armes Vince in New York, and who taught both Miss Lloyd and Miss Locke how to reach the top in the sport, regards fencing as specially benefitting women. George Santelli, who won an Olympic championship representing Italy,



FENCING TERMS

"En Gerde!"—in guerd position, ready.
"Allez!"—signal to begin.
"Touche!" Cry, "I em touched!" —signifying point has been scored.
Touch—contact of sword-tip with opponent's vulnerable aree.
Parry—defensive blow to werd off opponent's weepon.
Counter—smell, completely circular parry.
Riposte—attack following successful parry.
Beet—quick tap made by swinging the blade to force opponent's sword out of line and uncover the terget.
Escrime—fencing.

The fencer ei the top right tries to reach the leg of his opponent, who withdraws his foot and stops him with a "touch" on the arm. In the upper left corner e lunge with the foil reaches the target, a "touch" is scored. Center—The fencer on the right is cutting with his sebre et the heed of his adversery, who defends with e head perry. Bottom drawing shows two fencers on guerd, ready.

and holder of the U. S. open championship for men, conducts another leading school of fencing in New York. There a group of lissome D'Artagnans trade lunges, and there Mrs. de Tuscan trained for the Olympics. He regards one of his pupils, Carol King, who is lovely enough to win a beauty title, as a coming champion. Describing the difference between men and women fencers which, paradoxically, enables them to compete on a more or less equal basis, Santelli says:

"A man likes to make a showing, to flourish and gesture. He likes to look threatening and belligerent, and stamp around. That's fine for the woman. She parries, stalls for time, watches for an opening and—presto—she's scored."

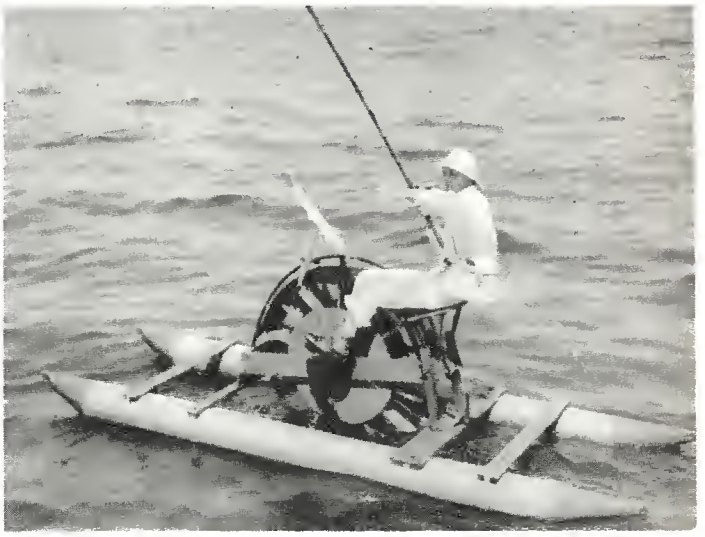
Society has succumbed to the rage, and such luminaries as Mrs. Stuyvesant Fish and Lady Mendl (Elsie de Wolfe) flourish the foils with vim. The aristocratic Junior League of New York proposes to engage Aldo Nadi, world champion for years, to coach its members *en masse*. Most universities have their teams, including three-fourths of the women's colleges of the country. At the University of Buffalo a score or more students call out French phrases of sanguinary import that have made romantic history as their blades flash under the tutelage of Kenneth Greene. At the University of Southern California 80 enthusiastic swordsmen practice regularly under the watchful eye of Professor H. J. Uttenhove, internationally famous coach. Then there is the powerful Amateur Fencers' League of America, with more than 800 members skilled in the ways of the sword, the New York Athletic Club, the Army and

[*Continued on page* 132]

Sportsman Fishes The Deep From Pedal Boat

STARTLING the fishing fraternity and the crowds of bathers at Venice, Calif., Barney Fry, daily pedals out to sea on his newly invented hydro-cycle, for a bout with the finny creatures of the deep. Propelled by a paddle wheel, and operated like a bicycle, the new craft is capable of a speed of 10 m.p.h. in rough water. Weighing 145 pounds, it is mounted between two fourteen-foot metal pontoons, and is easier to handle than an ordinary boat. Besides being faster than a row-boat, it is less strenuous to operate.

Fry, a well-known Pacific Coast sportsman, predicts that his new "fishing wheel" will become popular with anglers, being cheaper than a boat to build and providing a new aquatic thrill as it churns over the waves.



Barnay Fry, notad sportsman, surprises crowds at Venice, California, whan he padals out to sea on his naw hydro-cycle and spends a day catching deep water fish.

Sand "Barks" At Tourists

Tourists in Hawaii using ona of the accepted means of making the famous Barking Sands on the island of Kauai "bark." This strange sand occurs nowhare alsa in tha world.

BARKING sand is among other strange phenomena that makes Hawaii like some Never-never land. It occurs on the little island of Kauai, northwest of Honolulu, and nowhere else in the world. It "barks" like a dog when walked over, and is very much louder when a person is pulled bodily over it. Specimens of the sand, taken away in bottles and boxes by tourists, do not "growl," as the sand performs only in its very restricted native element.

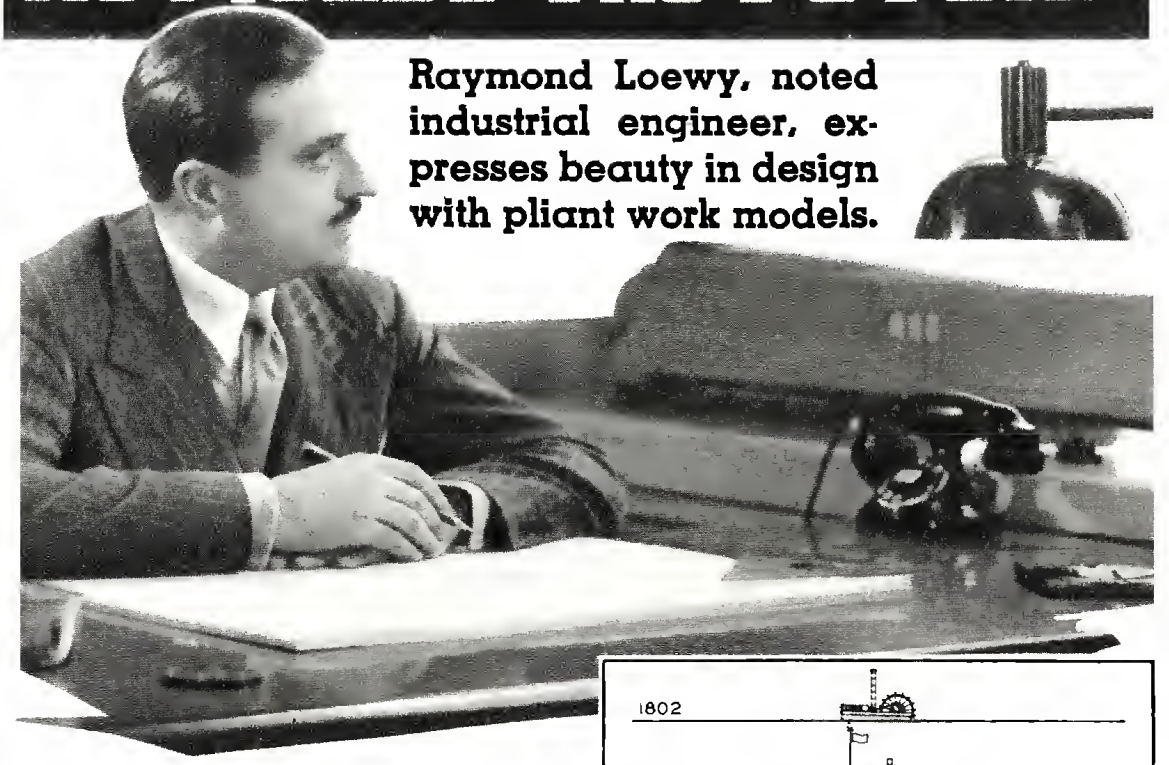
Old Castle Is Plane Beacon

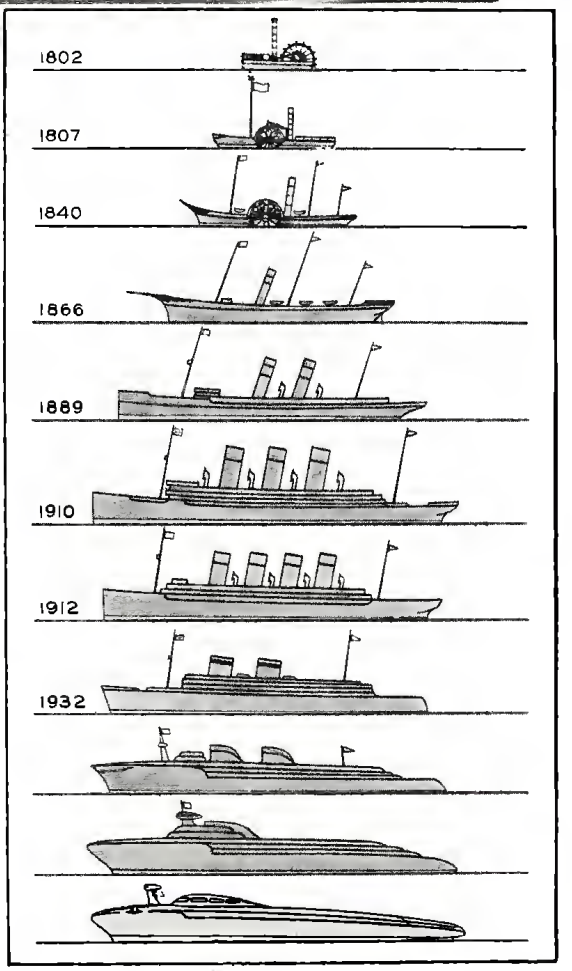
KINDLING a bright beam in the sky over the Valley of the Steiremark, in Austria, is the illuminated tower of an ancient castle, bathed in the glare of eight 1,500-watt searchlights. The brightly lighted tower is a rare sight in the night that thrills passengers traveling through the blackness of the valley where much of Central Europe's history was made.

The old marks the way for tha naw in Austria. Tha baautiful old towar of Steiremark Valley Castla, illuminatad bv huge searchlights, is a night beacon for planes.

He MOLDS The FUTURE

Raymond Loewy, noted industrial engineer, expresses beauty in design with pliant work models.





Above—Raymond Loewy, at his desk in a penthouse atop a N. Y. City skyscraper. From his drawing board emerged designs that have revived industries and given birth to others. Right—Evolution of steamship design. Last three sketches show Mr. Loewy's conception of ocean liners of the future.

A BOY who once dreamed of engines and machines in terms of beauty, finally has been able to realize his ambition by taking a leading part in the streamlining of one of the Pennsylvania Railroad's Pacific type steam locomotives.

The boy with the dream was a French youngster who grew up to become Raymond Loewy, one of the world's foremost industrial designers. He is one of an inspired handful of men who are quietly changing the physical appearance of the world we live in. He shapes the future out of clay instead of a crystal ball, and his studio is a place of engineering magic filled with the wonder of things to come.

In his penthouse high above Fifth Avenue in New York City, where Mr. Loewy and his staff design new models of lipsticks, automobiles, busses and ships, he and the railroad engineers worked together to produce the streamlining of the locomotive.

Now Mr. Loewy's vision reaches even further—to ocean liners which will show their

Out Of CLAY

by DONALD G. COOLEY

heels to the *Normandie* and *Queen Mary*, to "land cruiser" automobiles—even to the remaking of entire cities! One of his current projects is the replanning of Atlantic City with its world-famous Boardwalk and amusement pavilions.

Mr. Loewy is one of the few men who knows what your automobile will look like five years from now. His studio walls are covered with fascinating drawings of vehicles-yet-to-come, several of which are reproduced with this article so that readers of MODERN MECHANIX may sit in on a preview of the future. In studying them, remember that the cigarette case in your pocket, the typewriter you use, the bus or train you ride to work in, very probably began life as a shapeless lump of clay in Mr. Loewy's studio.

The story of the streamlining of the K4s, the official designation of the Pennsylvania's Pacific type engine, by the railroad engineers and Mr. Loewy reveals the way in which designs of this type can best be developed.

Mr. Loewy had already worked with the railroad engineers in the streamlining of an electric locomotive, but the steam locomotive presented different problems. Mr. Loewy was asked to ride in the cab of one of the Pennsylvania's steam locomotives and study its operation. He therefore observed the problem at first hand, after which pencil sketches were made and clay models constructed, one of which was tested in a wind tunnel.

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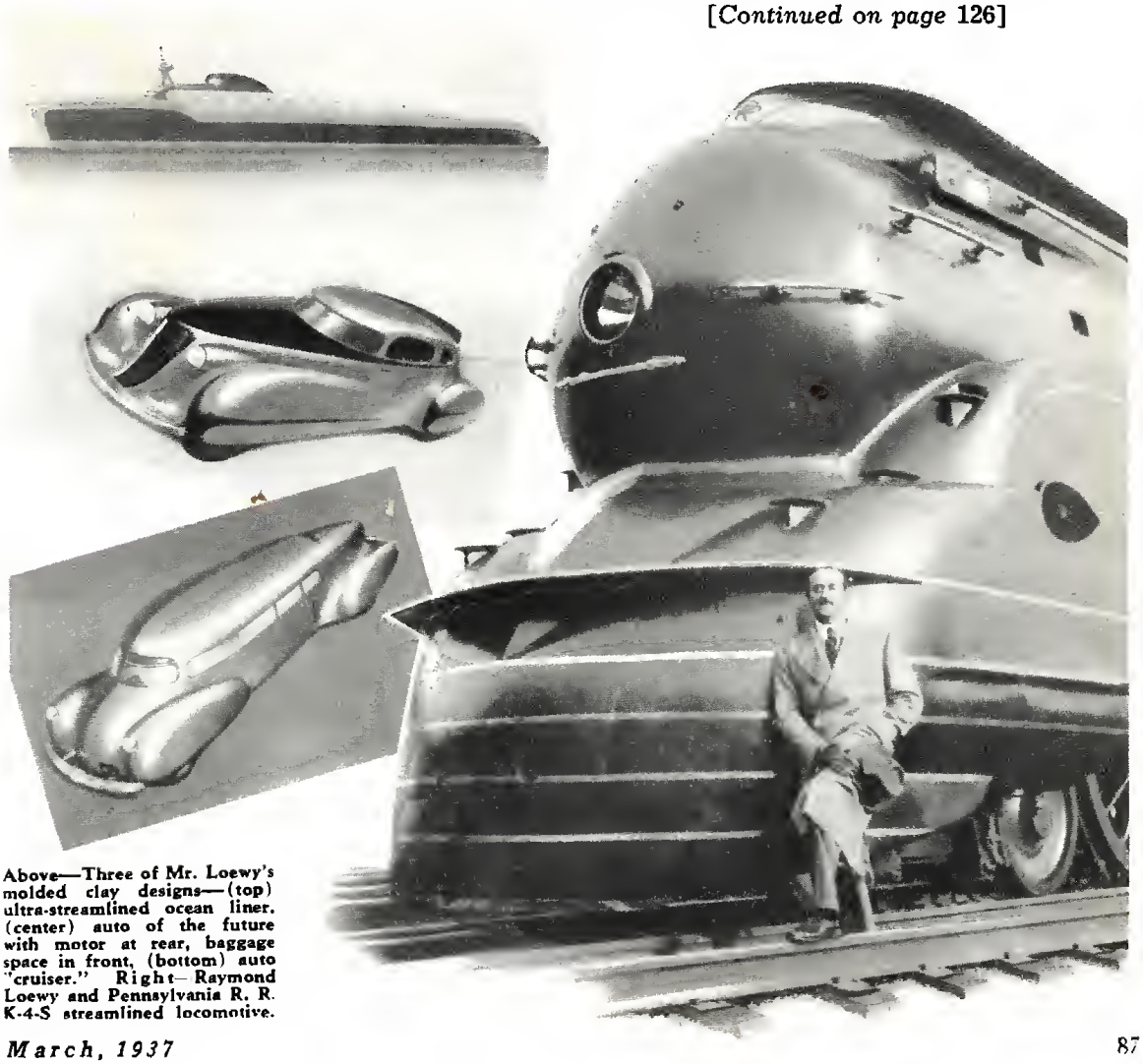


Above—Three of Mr. Loewy's molded clay designs—(top) ultra-streamlined ocean liner, (center) auto of the future with motor at rear, baggage space in front, (bottom) auto "cruiser." Right—Raymond Loewy and Pennsylvania R. R. K-4-S streamlined locomotive.

Completed San Francisco Bridge Aids Commuters

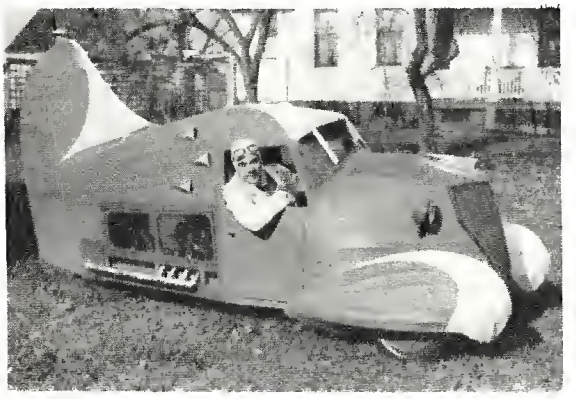
Aeriel view of completed San Francisco-Oakland Bay Bridge showing San Francisco approach. The span, with approaches, is 8½ miles long. Part of bridge tunnels through Yerba Buena Island. Towers, 746 feet high, clear water by 200 feet.

THE world's largest and most magnificent suspension bridge, the San Francisco-Oakland Bay Bridge, now in operation, has eliminated a 20-minute ferry trip for Oakland commuters. Subway type trains now carry the commuters to a central San Francisco terminal at a speed of 60 miles per hour.

The gigantic bridge proper is 4½ miles long, but the total length including the east and west approaches is 8½ miles. The towers are 746 feet high, giving the ships passing beneath the spans a clearance of over 200 feet at low tide. It is claimed that the amount of steel used in building the structure would load a freight train 20 miles long.

Aerocoupe Speeds 75 M.P.H.

HIGHLY streamlined and following accepted aeronautical design in construction, a novel aerocoupe developed by Richard Crossley, of East Haven, Conn., has a top speed of 75 m.p.h. The cabin resembles an airplane fuselage, featuring longerons, braces, etc. For traction, the vehicle is equipped with three airplane-type wheels.



Resembling an airplane fuselage in design and construction, this automobile carries its designer, Richard Crossley, of East Haven, Conn., at 75 m.p.h. Engine is at rear of cabin.

Model Glider Flies 3½ Hours

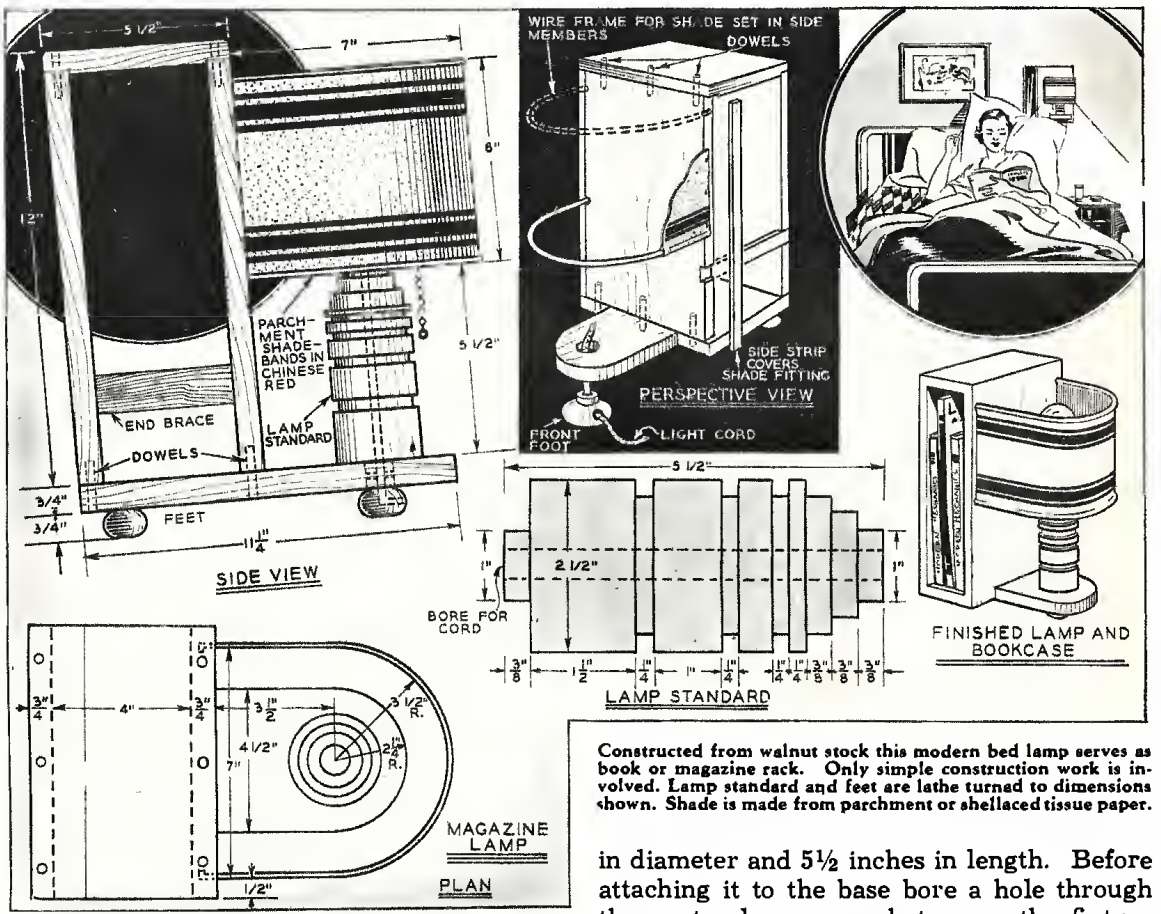
Huge wingspan of this model glider helped it to ride favorable air currents for three and one-half hours to set a world's record. Willi Bretfeld, of Hamburg, Germany, designed it.

SECURING its initial climbing power by means of hand-launching and soaring away on favorable thermal currents after attaining great altitude, a model glider built by Willi Bretfeld, of Hamburg, Germany, set a world's record of three and one-half hours continuous flight, traveling 50 miles.

Bretfeld's model will receive a place of honor aboard the "Hein Godenwind," a floating youth hostel in Germany. The government sponsors model contests to interest the younger boys in aviation.

WORKSHOP HOBBIES

Lamp Makes Handy Magazine Rack



Constructed from walnut stock this modern bed lamp serves as book or magazine rack. Only simple construction work is involved. Lamp standard and feet are lathe turned to dimensions shown. Shade is made from parchment or shellaced tissue paper.

MODERNISTIC in design, this stylish bed lamp also serves as a handy book or magazine rack. By using walnut throughout for construction and trimming the completed project in a bright Chinese red a very smart effect is achieved.

The base is constructed first according to the dimensions given in the accompanying illustrations. The base is cut from a single board and the sides and top attached with dowels glued in position. The lamp standard consists of a solid or built-up wood block which when turned down measures 2½ inches in diameter and 5½ inches in length. Before attaching it to the base bore a hole through the center large enough to pass the fixture cord with socket installed in top.

Feet for the lamp base are simply small knobs turned down on the lathe and glued into the holes provided for them. After completing the basic lamp construction finishing touches can be added.

The lamp shade is a piece of parchment paper attached to a U shaped wire frame which attaches to the side of the book rack. A thin strip of wood glued on each side of the rack completely hides the wire assembly.

Finish the walnut in natural color with the standard ribs and shade trimmed in red.

"MIDGET MIKE"

Any man or boy can build this locomotive. See next month's installment for prizes to be offered for the best models built by MM readers.

PART I

PACKING all of the thrills of modern railroad transportation into a corner of your den or basement workshop, model railroading provides an unequaled hobby for young and old alike. Starting with an investment of less than five dollars and using materials available on the open market anyone with patience can construct his own miniature system including everything from locomotives to automatic switching towers.

Tiny locomotives capable of pulling long strings of cars and having a truly authentic appearance provide the hobbyist with a spare-time vocation involving all of the traffic complications of a real railroad system. So small are the locomotives used in 00 gauge railroading that their height scarcely exceeds that of a package of cigarettes yet they have sufficient traction to pull loads exceeding fifteen pounds.

Here is described a miniature locomotive designed so that anyone, without purchasing any special parts except for a set of drive wheels, can build his own complete system starting with the most important piece of equipment—the motive power unit. Through the use of brass channel iron, brass tubing, copper wire and a few other incidental pieces of material "Midget Mike" becomes a reality. It is a model that will thrill everyone who sees it in operation.

It is most essential that you thoroughly read the construction notes before starting actual work in order to gain a complete

No taller than a package of cigarettes, "Midget Mike" not only looks like a real locomotive, but performs like the mightiest of rail monarchs.

a 00 Gauge Model Locomotive

understanding of the terms and the methods applied. The "Bill of Materials" gives the actual amount of materials required plus a small amount for trimming and waste.

Before attempting to construct this model locomotive, which is almost entirely made of metal, it is important to know something of the technique of soldering. A properly soldered piece of work is the mark of a craftsman while a poor soldering job cannot do credit to anyone. Soldering is the most useful method of joining metal parts that the average craftsman employs. Soldering is nothing more or less than joining two surfaces by flowing a thin film of molten low-melting-point metal between them. The thinner the solder film the stronger the joint. Thus, large gobs of solder around joints do not materially add to the strength and are unsightly as well.

The average solder used by the home craftsman is known as "Half and Half" and consists of equal parts of tin and lead. While there are special solders for special purposes using different proportions of the ingredients, we are not concerned with them.

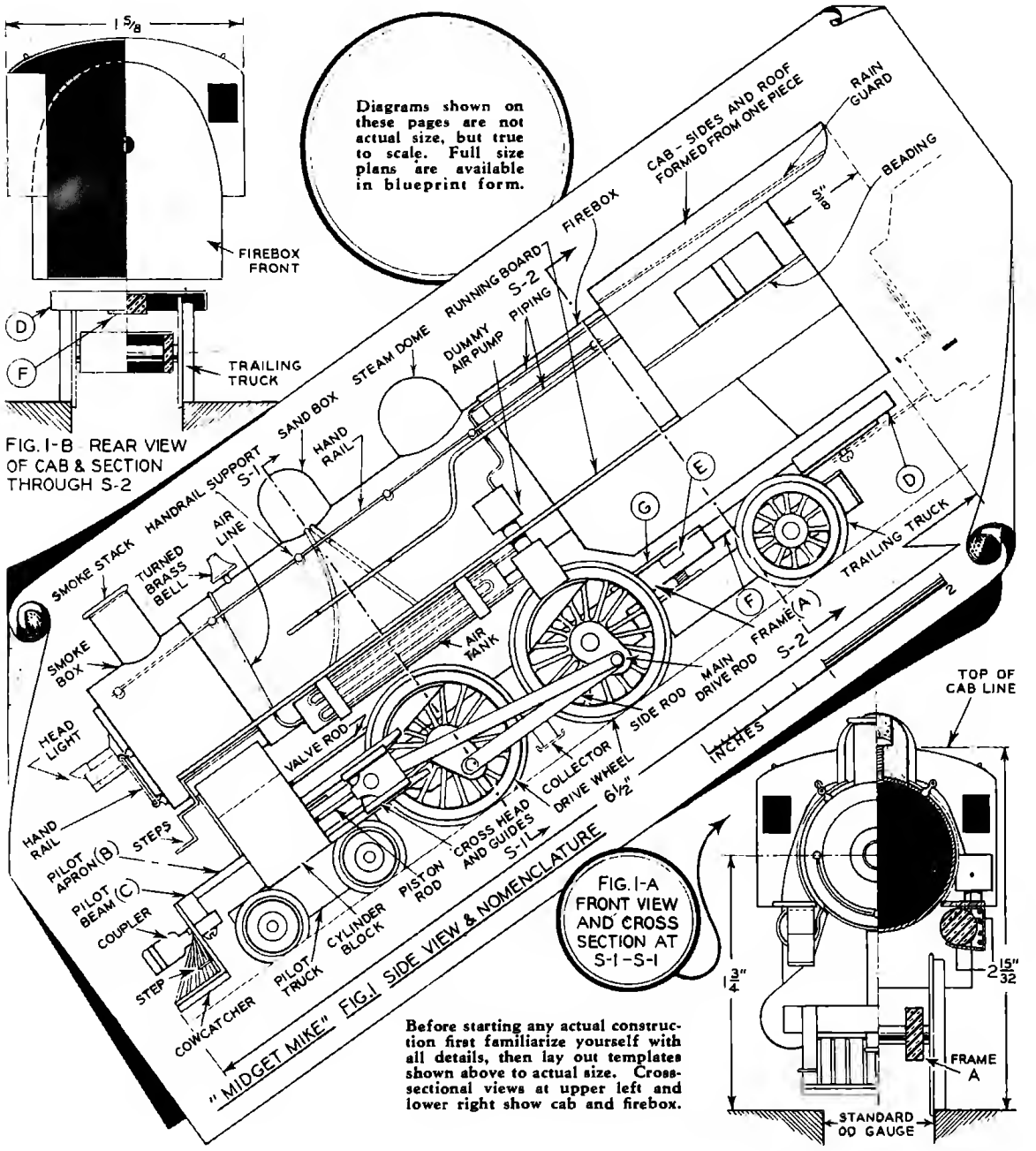
Solder in the form of a hollow wire with a rosin or acid flux as a core is the most convenient to use. A ten-cent spool of this solder contains more than enough for the building of this locomotive. The metal surfaces to be soldered must not only look clean but must be chemically clean, otherwise the solder will not stick and all your work has gone to naught. To solder correctly, not only must the solder be heated to the melting point but the surfaces to be soldered must be heated to the same degree so that the solder will adhere. Thus it will be seen that a large soldering iron is necessary in order to do a good job. After some use the soldering iron must be "tinned." This is nothing more than a thin coat of solder on the working surfaces of the iron. To tin an "iron" it must be heated and then the surfaces filed until they show a bright copper color. Then dip the iron into the flux and then flow solder on these new surfaces until they are covered.

When difficulty is encountered in flowing solder between two flat surfaces, coat each surface with a thin coat of solder, then place the two surfaces together and apply the iron to the work until the solder runs freely, remove the iron and allow the work to cool. This is known as sweating.

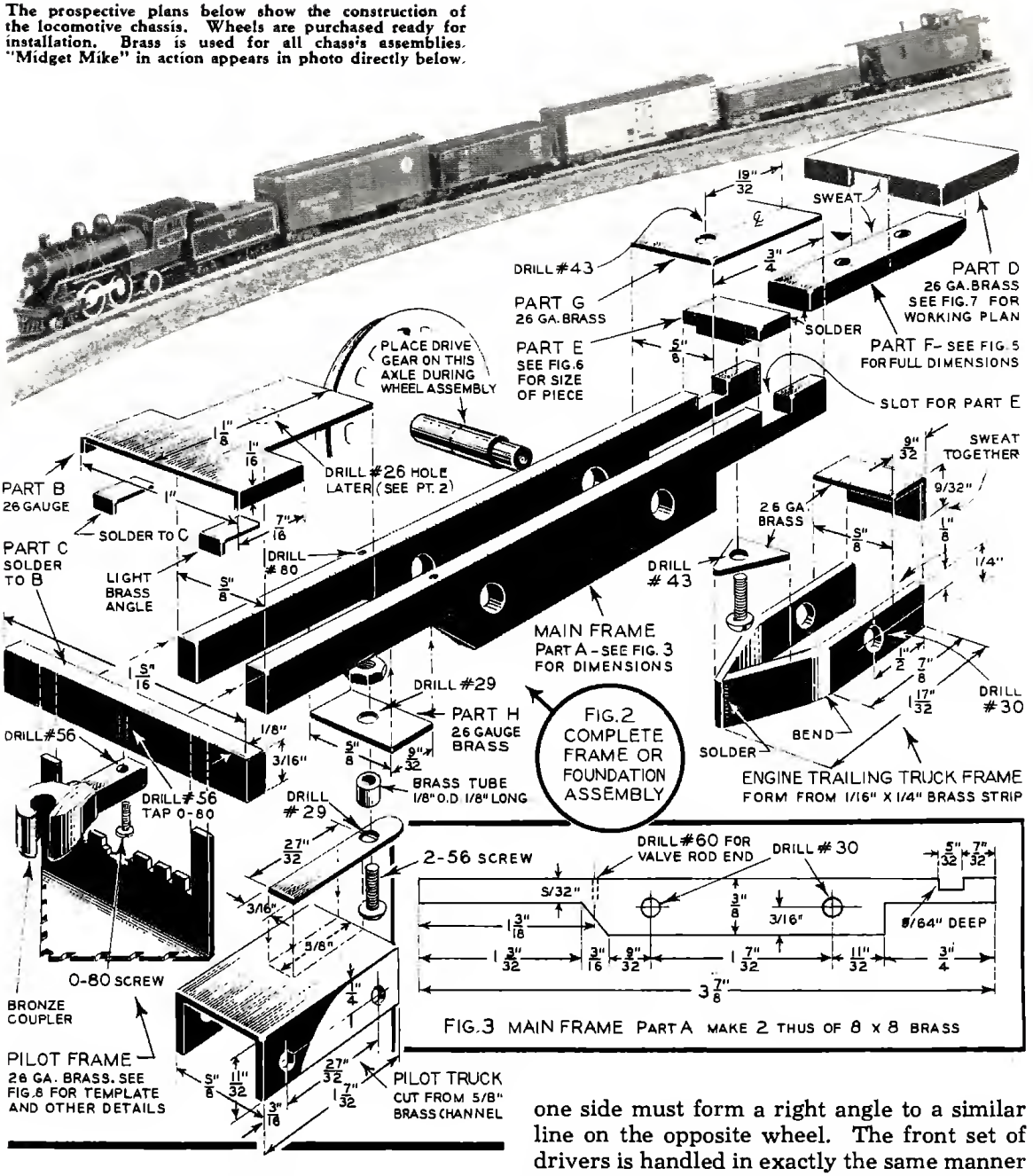
Built from brass channel and tubing and scraps of tin "Midget Mike," shown in the hands of Miss Edythe Little, is a marvel of modern craftmanship.

It is only logical to start construction with the foundation which is in this case the main frame. Saw out two blanks of ⅛"x⅜" brass according to the plans. Now saw and file one blank to the correct shape as shown in the detail plan of part "A" as outlined in Fig. 3. Firmly clamp the finished piece in the vise together with the rough plank and using the finished piece as a guide saw and file the second piece to the outline of the first. As you will see later, it is of the utmost importance that both pieces are exactly the same. Now carefully cut one piece, mark the centers for the axle holes, and drill them with a No. 30 drill. Now using this piece as a guide carefully drill the holes in the other side piece. Drill the No. 60 holes as indicated.

Laying these pieces aside for a while, we must start work on the drive wheels. These are better purchased than homemade as they are exceptionally accurate and the cost is not prohibitive. The axles are made to fit these wheels and cost the same as a package of chewing gum. To press the wheel on the axle, file the sharp edge off the end of the axle. This gives a slight taper and enables the axle to start on its way into the hole in the wheel. Place the wheel and axle in the

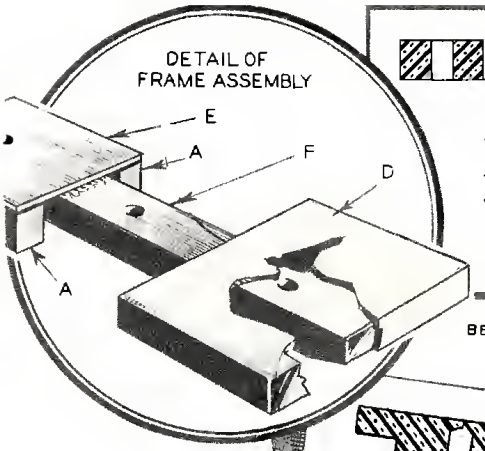


The prospective plans below show the construction of the locomotive chassis. Wheels are purchased ready for installation. Brass is used for all chassis assemblies. "Midget Mike" in action appears in photo directly below.



vise and after checking the squareness, close the jaws of the vise and so press the wheel on the axle. Saw off any excess axle and file smooth. Put the axle through the rear hole of one side frame, slip the gear on the axle, put on the other side frame and then press on the other wheel.

At this time we must take up "quartering." In order that the engine may start after a stop, there can be no "dead spots." To overcome this, the cranks must be placed 90 degrees apart. In other words a line drawn from the crankpin to the axle on the wheel on one side must form a right angle to a similar line on the opposite wheel. The front set of drivers is handled in exactly the same manner as was the rear set, only without the gear. Make piece "E" as shown in the detail drawing (Fig. 6). Set the frame and wheels on a level section of track and fit piece "E" in place. By making the frame in two pieces, any slight inaccuracies in drilling the axle holes can be compensated for and all four wheels will contact the rails. Piece "E" must be accurately cut as this determines the clearance between the drivers and the frame. Place a block of wood between the front ends of the side frames to hold them parallel and with the wheels still sitting on the rails, solder "E" in place. Make pieces "B" and "H."



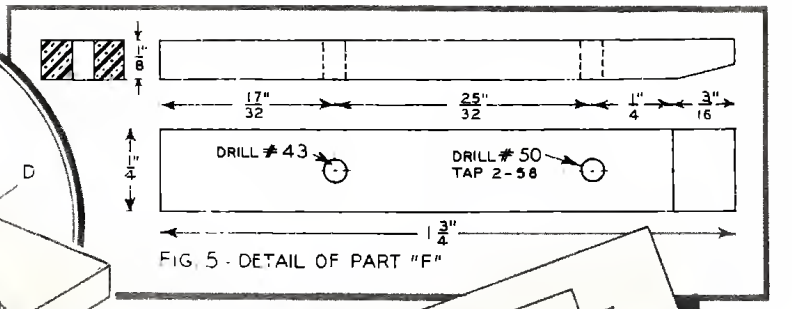


FIG. 5 - DETAIL OF PART "F"

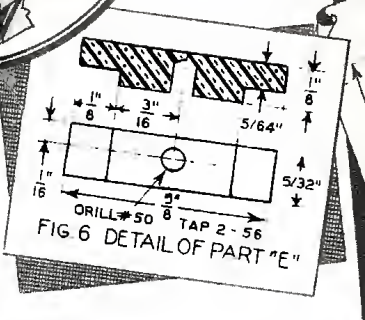


FIG. 6 DETAIL OF PART "E"

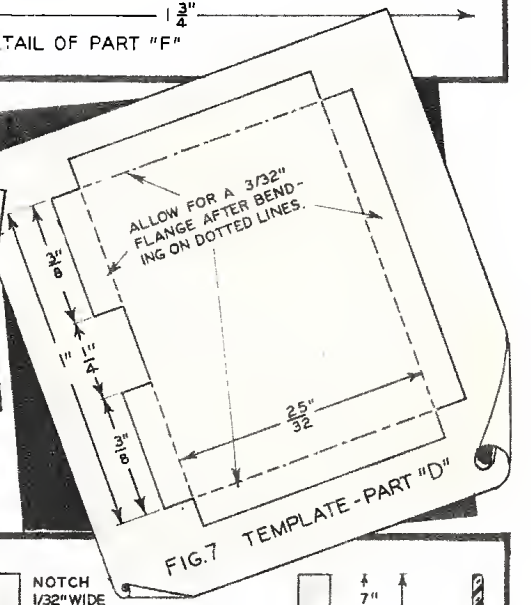


FIG. 7 TEMPLATE - PART "D"

Details and assembly of locomotive frame are shown here. Templates for each unit should be enlarged to actual size from diagrams. Sweat solder all parts.

as in Fig. 2, and solder in place. Now the frame is rigid and level. Now, after having made part "F," (in Fig. 5), clamp it to the underside of "G," as shown in Fig. 2, with the end against "E" and solder it in place. Part "D," of Fig. 7, is now made and soldered to "F."

Cut the pilot beam "C," shown in Fig. 2, from brass and solder it to the front of "B." Solder two small brass angles to the underside of "B" and the rear side of "C," this reinforces the pilot beam.

The pilot or cow-catcher, described in Fig. 8, is made of 26 gauge sheet brass and heavy brass wire. The frame is bent in the vise to the shape shown. Then file the notches for the brass wire, lay pieces of wire in the notches, solder and file flush with the underside and rear. Then solder two strips of 3/64" brass around the front on the underside. The two sets of steps are merely scraps of brass filed to shape. Note the short cross bar on the pilot bars. File this piece until it almost slips between the two bars, then solder in place. The center bar is then soldered to it. The coupler shank (see Fig. 2) is drilled

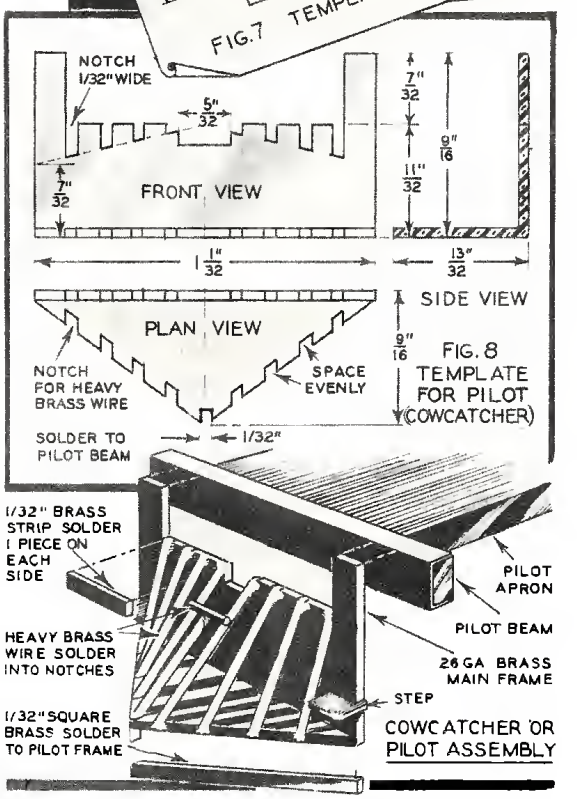


FIG. 8 TEMPLATE FOR PILOT (COWCATCHER)

MATERIALS LIST

A complete list of materials required for building "Midget Mike" along with the names of model locomotive dealers supplying the special parts is available at no cost. Simply send a 3c stamp to cover return postage to Modern Mechanix Model R. R. Editor, Fawcett Bldg., Greenwich, Conn.

No. 52 and mounted to the pilot beam with a 0-80 brass screw which is set tight, as the coupler does not swing.

The two-wheeled trailing truck frame, in Fig. 2, is made from $\frac{1}{16}$"x¼" brass strip. Measure to the bend and mark with a pencil,

not a scriber as the scratch from the point of the scriber would have a tendency to start a crack. Place one end of the truck side in the vise and bend to the proper angle. It is not necessary to use a mallet for this work, merely press with your hand. File the ends as shown and drill a No. 30 axle hole in each frame. From No. 26 gauge brass, bend the end plate and cut out the front pivot plate. Sweat these plates in place and solder the front ends of the side frames together. The 17 millimeter wheels are pressed on the axle in exactly the same manner as the drive wheels. Drill as No. 43 hole in the front pivot plate for the screw used as a pivot.

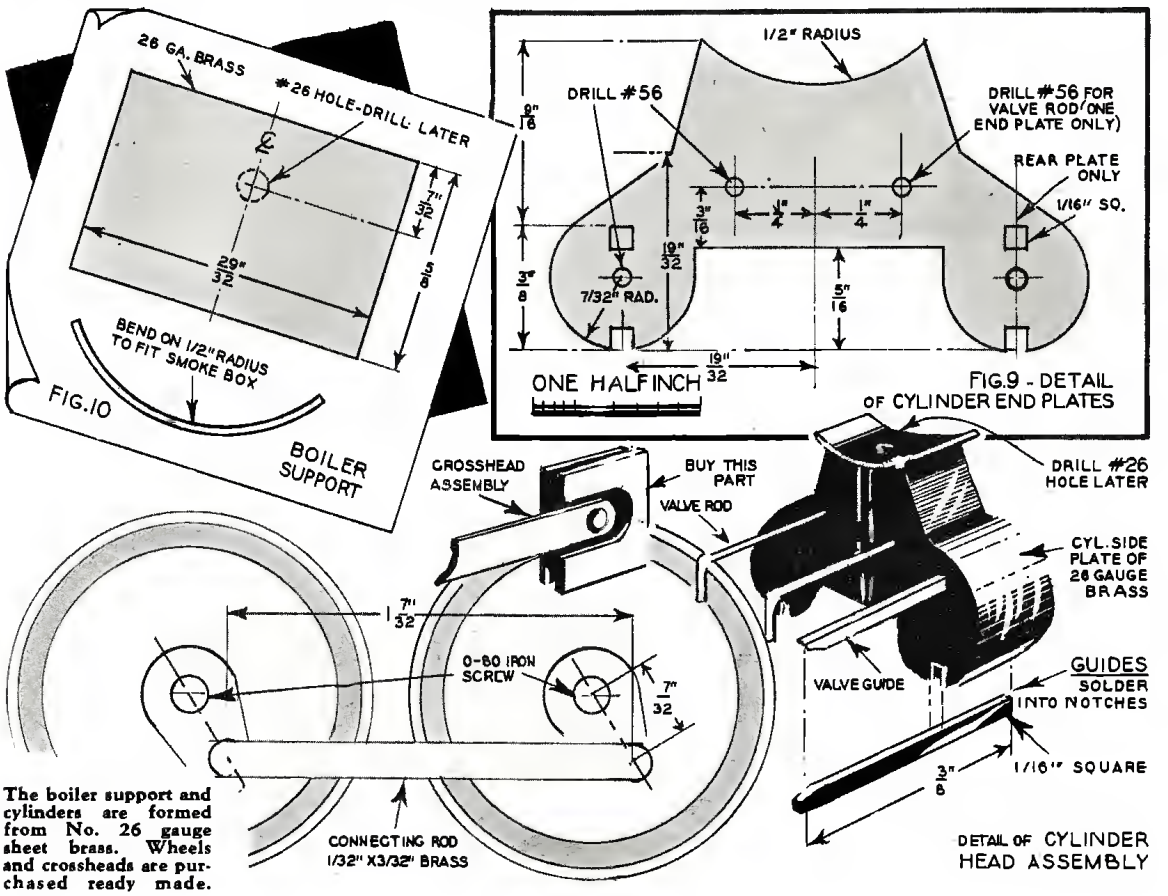
The pilot or leading truck in Fig. 2 is essentially a piece of 5/8" brass channel. File the sides down to conform with the plans. Carefully lay out and drill the axle holes. These must be exact or else all four wheels will not contact the rails and derailments will be frequent and annoying. This construction detail will be described next month. Drive one wheel off each axle and insert the axles through the axle holes. Then force the wheels back on the axles and saw and file the excess axle flush with the hubs of the wheels. Solder the pivot bar of 26 gauge brass in place on top of the channel and drill a No. 29 hole in the end as shown. An 1/8" length of 1/8" outside diameter tubing is then slipped through the hole to act as a bushing, as shown in Fig. 2, and a 2-56 screw is put through the bushing and through the No. 43 hole in piece "H" and a nut is screwed on from the top. The bushing prevents the pilot truck from binding and allows the screw to be set up tight.

A very important part of the engine is undertaken now, namely the cylinder block.

Saw and file the front and rear plates from No. 26 gauge brass according to the full-size pattern in Fig. 9. In the rear plate, drill the holes for the piston rods, valve rods and the upper guides. The front plate is the same only without the holes. From No. 26 gauge brass cut out the cover plates and carefully solder in place. Now file the slot in the bottom for the lower cross-head guide. The guides are 1/16" square brass and are soldered in place.

The cross-heads are either purchased or filed from a piece of 1/8" brass. It is advisable to purchase them, however, as there is a recess in the back to take the end of the main

[*Continued on page* 126]



The boiler support and cylinders are formed from No. 26 gauge sheet brass. Wheels and crossheads are purchased ready made.

Binding Magazines Into

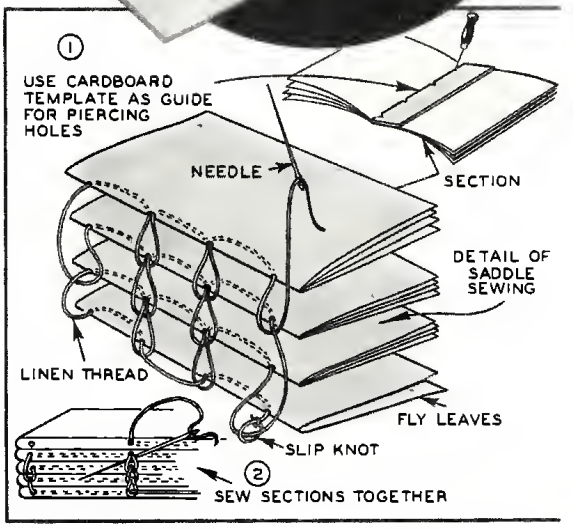
Following these simple instructions anyone can easily bind his favorite magazines into book form.

Your magazines become a permanent reference when bound, as shown here, into attractive volumes of six issues. Anyone without special tools can successfully bind his own library editions.

by Fred A. Beard

MANY home craftsmen have experienced the desire to bind their copies of MODERN MECHANIX and other favorite magazines into volumes, in order to preserve their contents against loss or disorder. Contrary to the general supposition, such magazines can be bound at home just as neatly and securely as a book bindery can do them, and the same process can be employed. Equipment and materials required are few and simple, but the chances are great to exercise careful craftsmanship.

MODERN MECHANIX is best bound in volumes of six issues each, although twelve issues are not too thick if the advertising sections from the front and back are first removed. Remove the covers and pull out the wire stitches from the magazines, separate the sections, and stack them in order. Write or type an index on a sheet 6⅝x9⅝ inches and "tip" it to the book by putting a thin strip of paste along the inside edge of the sheet, and sticking it to the first section. Now fold two sheets of blank book paper 9⅝x13¼ inches and place one at the top and one at the bottom of the stack. These are to serve as fly leaves. A printed title page ad index for the past year may be obtained from the publishers for 10 cents.



To bind several magazines into a single volume first tear off the covers, punch holes through the center of the books and sew according to the method shown above, using a darning needle.

You are now ready to start sewing the book. Cut a templet of cardboard as long as the magazine's longest dimension, and mark or nick one edge of it about half an inch from each end, and two (or any even number) more places evenly spaced between them. Open at the center each section of the book to be bound, and, using this templet and an awl, punch holes as indicated in Fig. 1.

Attractive Library Volumes

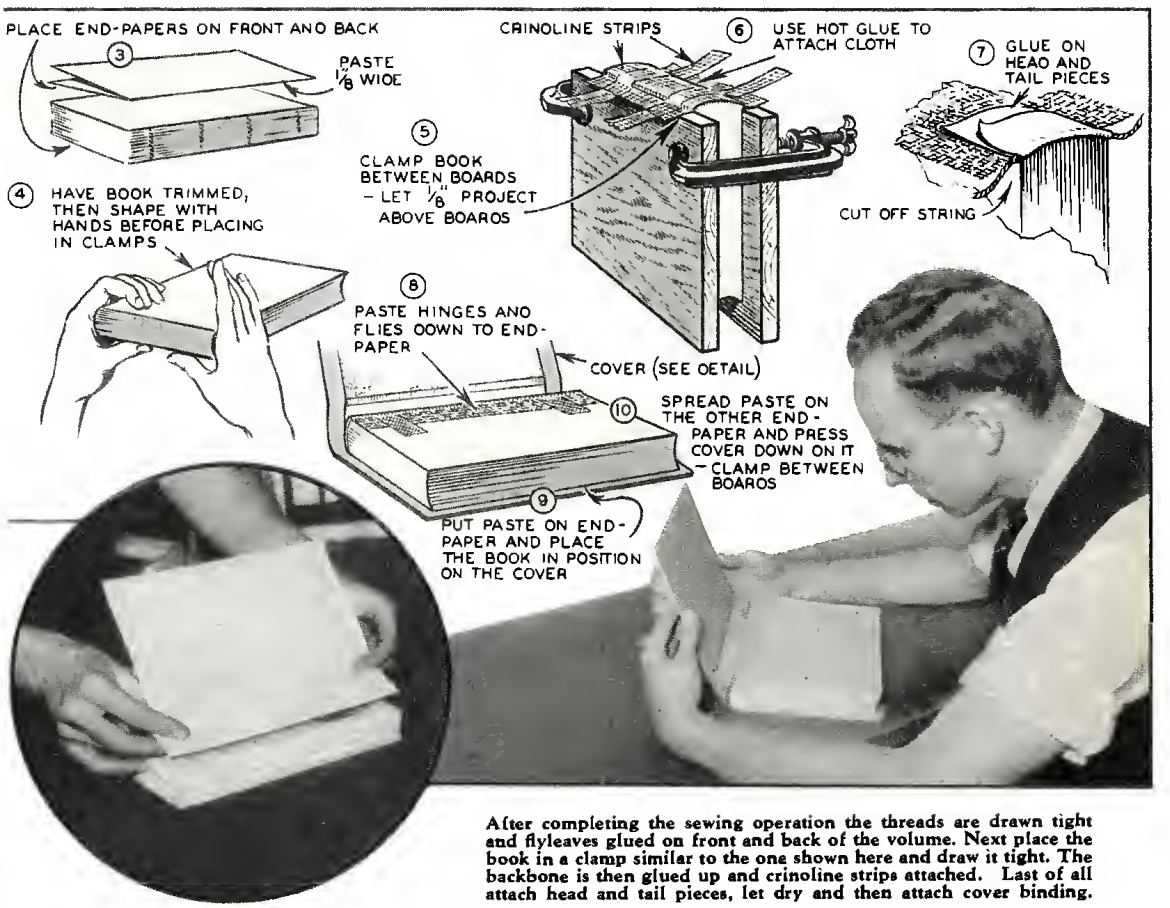
Sewing should be done with a darning needle and linen or buttonhole thread. The first thread should have a slip-knot in the end of it. Do not sew with a double thread, except in the case of thin books, for it causes the backbone to thicken too much.

Start with the fly-leaf section at the *back* of the book, and lay it on the table with the fold toward you. Beginning at the hole on the right, run needle through the first hole, out the second, into the third, and out the fourth. Draw thread up until just the slip-knot remains outside the first hole. Lay the next section in order on top of it, insert needle into lefthand hole and out the next. Now go down and catch the thread that runs into the hole below, come back and insert needle into the *same hole,* then out the next hole, loop down through previous thread again, and out the righthand hole. Now run needle through the slip-knot you left at the start, draw slip-knot tight and take up slack in the thread. Lay the next section on top again, insert in righthand hole, and repeat as before, each time looping around the stitch made on the previous section, as detailed in Fig. 1.

More thread can be tied on with a square knot as it is used up, so the result will be as though the entire book were sewed with a continuous thread.

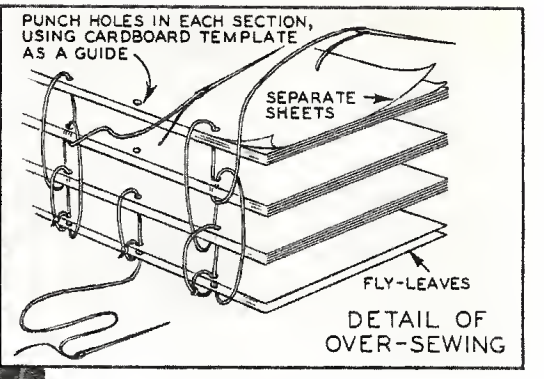
Over-sewing is used mainly for books consisting of single loose sheets, such as typewritten notes and the like. It is done with four, five or any number of separate, continuous threads, each with a needle. The sheets are first counted into equal sections of say sixteen sheets and laid criss-cross in order. The sections are punched with an awl through a templet, about ⅛ of an inch from the edge, and spaced about the same as in saddle-sewing.

As in saddle-sewing, have three or four


PLACE END-PAPERS ON FRONT AND BACK
3
PASTE 1/8 WIDE
4 HAVE BOOK TRIMMED, THEN SHAPE WITH HANDS BEFORE PLACING IN CLAMPS
5 CLAMP BOOK BETWEEN BOARDS - LET 1/8" PROJECT ABOVE BOARDS
CRINOLINE STRIPS
6 USE HOT GLUE TO ATTACH CLOTH
7 GLUE ON HEAD AND TAIL PIECES
CUT OFF STRING
8 PASTE HINGES AND FLIES DOWN TO END-PAPER
COVER (SEE DETAIL)
9 PUT PASTE ON END-PAPER AND PLACE THE BOOK IN POSITION ON THE COVER
10 SPREAD PASTE ON THE OTHER END-PAPER AND PRESS COVER DOWN ON IT - CLAMP BETWEEN BOARDS

After completing the sewing operation the threads are drawn tight and flyleaves glued on front and back of the volume. Next place the book in a clamp similar to the one shown here and draw it tight. The backbone is then glued up and crinoline strips attached. Last of all attach head and tail pieces, let dry and then attach cover binding.

With the completed book held in the clemps the title is peinted on the beckbone with india ink es shown.



In binding thin leaflets or single sheets of peper this "over-sewing" method is suggested. Linen thread is used for stitching.

blank sheets at the front and back for fly-leaves.

Begin by tying a thread through each hole on the first section, as shown in Fig. 2. Lay the next section on top of it, and, sewing from the top down, run thread through *both* sections. Repeat for each thread. Now lay the next section on top of that, and always sewing from the top down, and running the needle through *two* sections each time as before, continue the operation until the book is sewed.

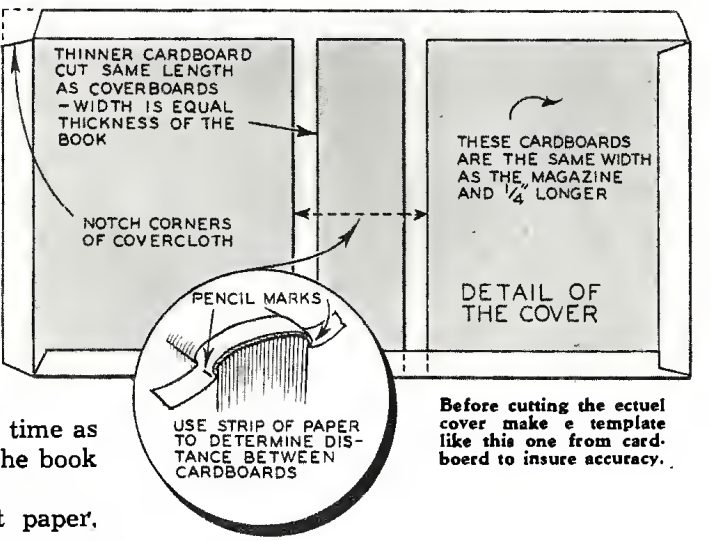
The end papers may be of kraft paper, decorative paper, or just plain book paper as you like. There is to be one at the front and one at the back; they are made as follows: Fold two sheets of paper 9⅝x13¼ inches with decorations, if any, inside. On one side of the folded edge, brush paste about ⅛ inch wide the entire length of the fold; place in position on the book as illustrated in Fig. 3.

After the book has been sewed and end papers attached, it should be taken to a print shop and trimmed.

Shape or "crown" the book between the hands as illustrated in Fig. 4, and clamp it tightly between two boards, allowing the back edges to extend about ⅛ of an inch above the edges of the boards. As it is squeezed, this ⅛ inch will be forced outward to form a bead on which the cover is to hinge.

At this point the book should be measured as in Fig. 7 to determine how far apart the cover boards must be.

Cut a piece of crinoline or stout linen cloth


THINNER CARDBOARD CUT SAME LENGTH AS COVERBOARDS —WIDTH IS EQUAL THICKNESS OF THE BOOK
NOTCH CORNERS OF COVERCLOTH
PENCIL MARKS
USE STRIP OF PAPER TO DETERMINE DISTANCE BETWEEN CARDBOARDS
THESE CARDBOARDS ARE THE SAME WIDTH AS THE MAGAZINE AND ¼" LONGER
DETAIL OF THE COVER

Before cutting the ectuel cover make e template like this one from cardboerd to insure accuracy.

a little shorter than the length of the book and about two inches wider than the thickness of it. Also cut two strips of the same material about 1x8 inches. Brush hot glue over the entire backbone, being careful to work it into the cracks. Lay the three pieces of cloth over the backbone, the large one lengthwise, and the other two crosswise, as in Fig. 5, and apply another coating of glue.

It is now ready for the head and tail bands. After they have been put on, leave the book in clamps for a day or two to dry.

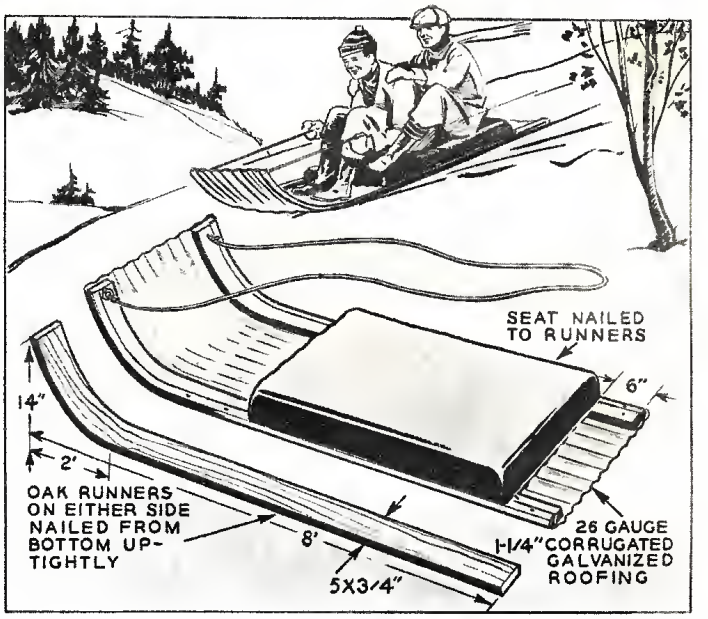
These serve both as a decorative finish and as a cushion to prevent the cloth cover from breaking or fraying. They can be made of corduroy, denim, corded silk, or whatever you choose. Cut two pieces of the material as wide as the thickness of the book and about 3 inches long. Cover the inside of them

[*Continued on page* 126]

CORRUGATED ROOFING Makes Speedy Toboggans

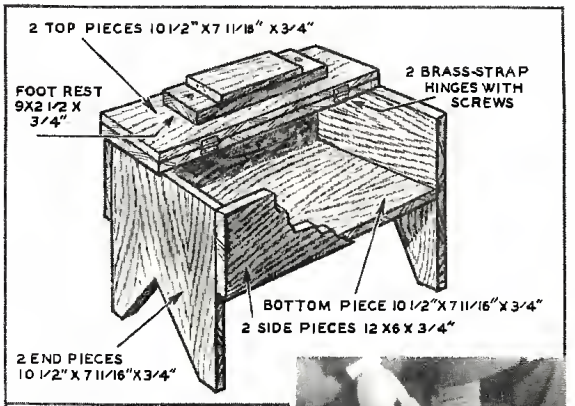
A SPEEDY toboggan large enough to carry three youngsters or two adults can be designed from a sheet of galvanized corrugated roofing and a pair of oak runners at a total cost of less than one dollar.

A sheet of No. 26 gauge iron measuring 8 feet by 26 inches serves as the running surface. Turn up each side of the sheet to form a flange having an opening of ¾-inch. This can be best accomplished by turning the metal over the oak reinforcement pieces before they are bent to shape. The oak strips are placed in boiling water for half an hour until the wood becomes soft enough to permit bending the ends to the shape shown in the diagrams. Place the bent runners in wood clamps and allow to remain there until they have dried out thoroughly.



Racing over snow crusted hillsides is fun with this unique toboggan. The racer is formed from a sheet of No. 26 gauge corrugated roofing metal 8 ft. long and 26 in. wide. Oak runners, steam bent, form the side reinforcements.

Complete the assembly by turning up the ends of the corrugated metal so that they follow the angle of the runners. Insert the runners in the flanged edges and secure with flat head wood screws. An old auto seat cushion completes the toboggan. Attach pull rope by inserting two screw eyes as shown.


2 TOP PIECES 10 1/2" X 7 11/16" X 3/4"
FOOT REST 9X2 1/2 X 3/4"
2 BRASS-STRAP HINGES WITH SCREWS
BOTTOM PIECE 10 1/2" X 7 11/16" X 3/4"
2 SIDE PIECES 12 X 6 X 3/4"
2 END PIECES 10 1/2" X 7 11/16" X 3/4"

This attractive stool serves as a handy cabinet for storing shoe dressing materials and polishing cloths. Its construction is so simple that even a child can build it. White pine, ¾ inch thick, is used throughout.

Stool Houses Shoe Shine Kit

A NEAT little foot stool is one article that every home can find many uses for, especially when it serves the double purpose of shoe shine stool and polish cabinet. The stool is assembled from ¾-inch stock, white pine preferred although any available wood can be used.

The various pieces are first cut to the shape and sizes indicated on the diagram shown at left. After each piece has been carefully measured and cut it should be sanded smooth with a medium size sandpaper or emery cloth.

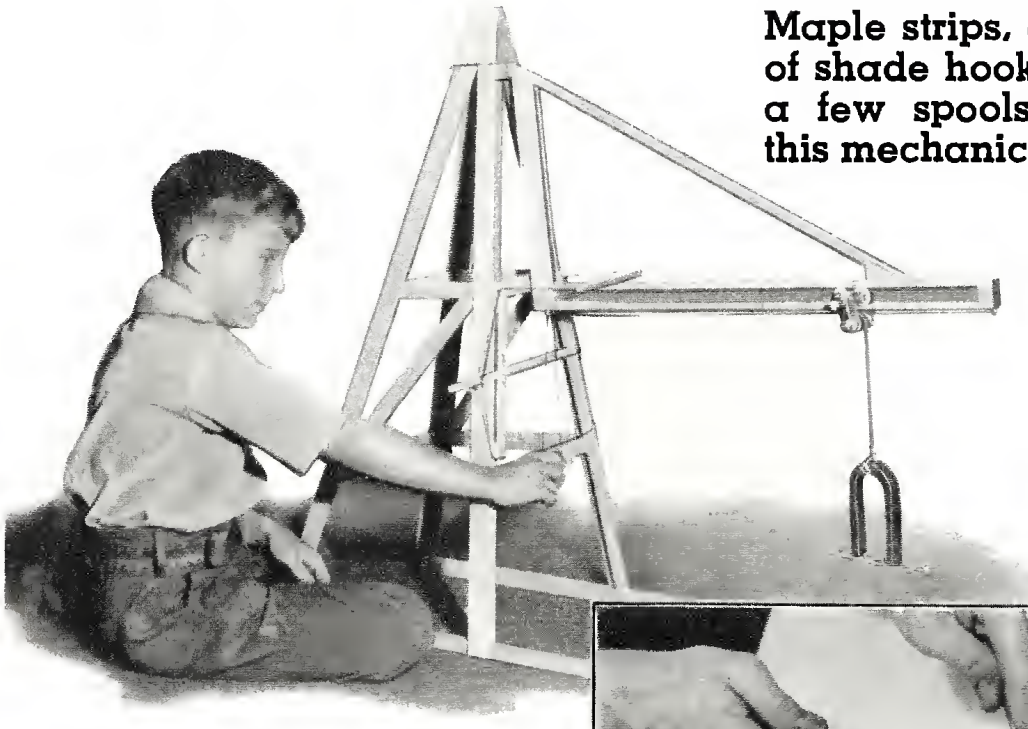
Assemble the polish cabinet by nailing up the end and side pieces. Use 1½-inch finishing nails for assembling or flat head brass screws. If the completed cabinet is to be stained and varnished the nails should be used. After countersinking the nails fill up the holes with wood filler.

The bottom is attached next. This should fit snugly and when once in place nailed fast. The lid is constructed in two parts; one half being hinged and the other half nailed down to the end pieces. Before attaching the lid a pair of brass hinges should be purchased and with a pen knife cut out a recess so that when mounted the hinges will be flush.

Complete the cabinet by attaching the shoe rest inside the hinged portion of lid.

ANY BOY CAN BUILD

Maple strips, a pair of shade hooks and a few spools form this mechanical toy.

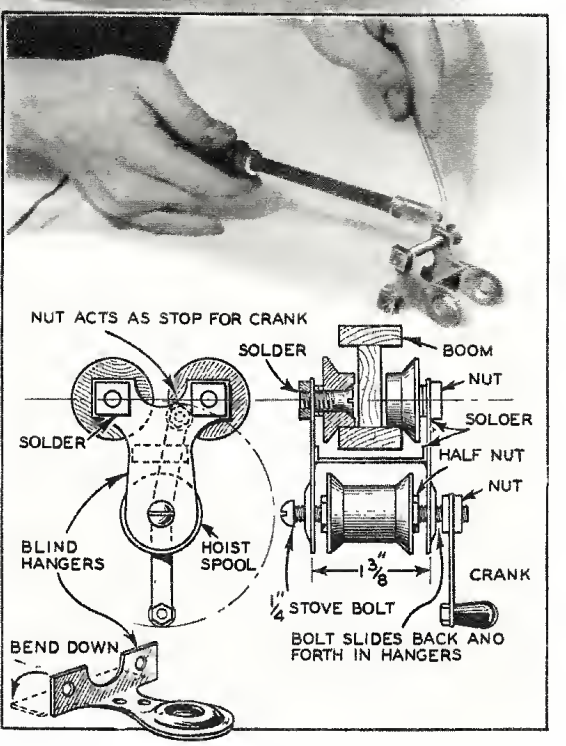


What boy wouldn't be thrilled to own this magnetic crane hoist? With a magneto magnet attached to winch cable it can be made to perform just like real ones used in industry. It can be built for $1.

by Ralph T. Moore

ANY boy and his dad can put this crane together in one evening since only simple construction is required. The crane, itself, is assembled from strips of ¾ by ¼-inch maple or any other wood possessing similar strength. Eight strips, each measuring 24 inches in length will be required for the uprights. The uprights come to a point at the top and are held rigid by gussets cut from thin plywood. In order to prevent the completed crane from tilting it is built on two ½ by ½-inch runners measuring 25 inches in length. The accompanying illustrations show the simplicity of this construction. Braces are fastened to the uprights by means of small escutcheon pins. For added strength joints may be glued.

The crane upright completed, work on the swinging boom is next started. The boom, like the crane tower, is also assembled from ¾ by ¼-inch strips. For the boom track three strips, each measuring 22 inches in length, will be required. These are assembled in the form of an "I" beam with small blocks inserted in one end so as to prevent the hoist car from running off the track. Attach the track to the "U" shaped upright forming the rear part of the boom. Like the "I" beam, this upright is assembled with glue and escutcheon pins. To complete the boom as-

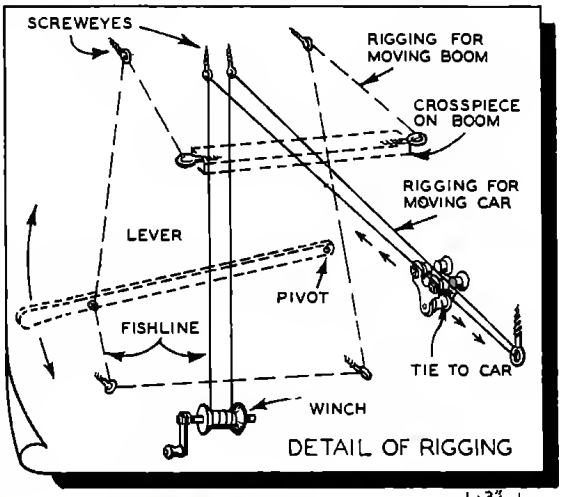


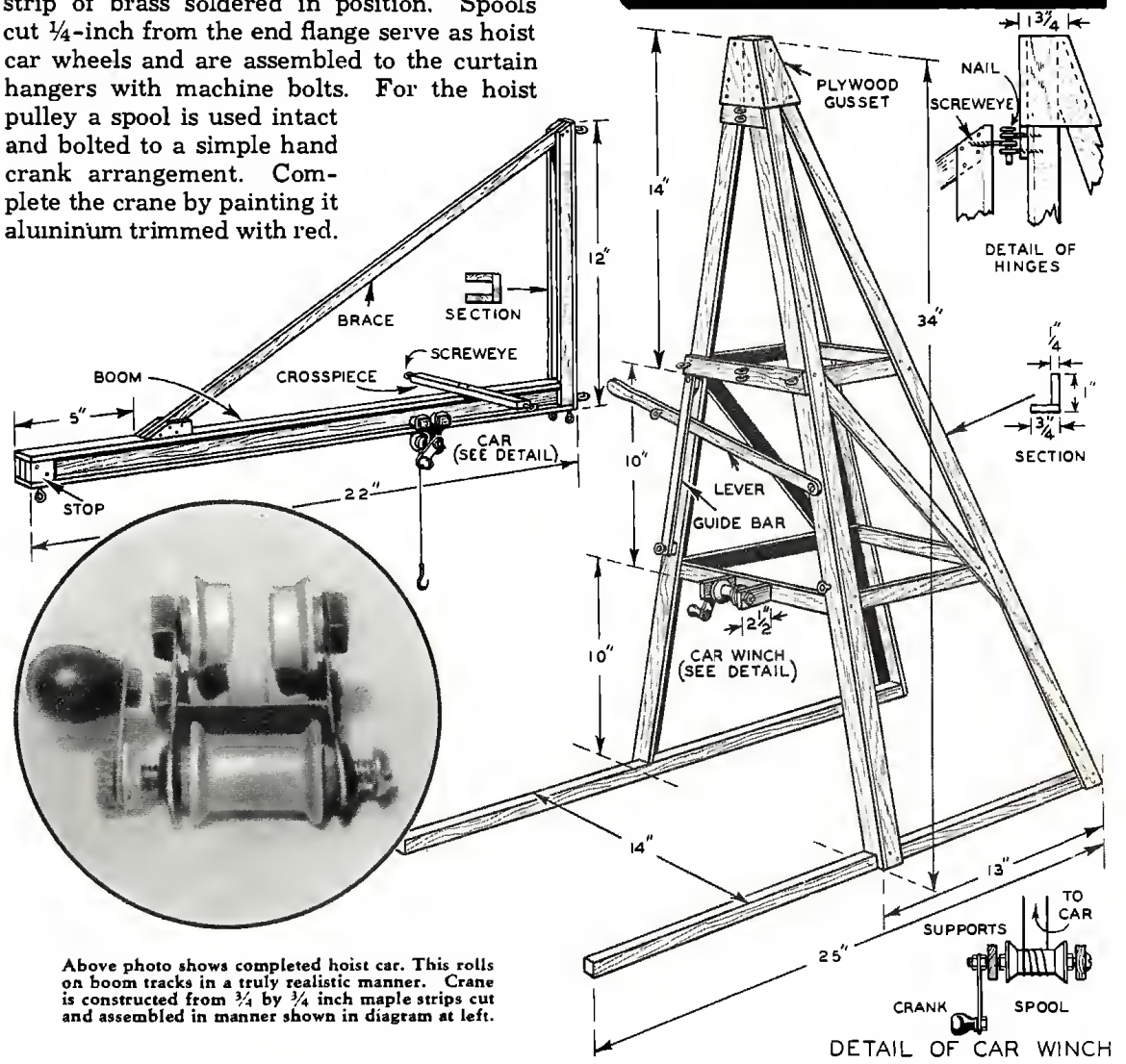
The hoist car is constructed from a pair of window shade hangers flattened out as shown here. Spools serve as wheels for the winch and hoist drums. Stove bolts provide suitable axles on which the pulleys turn.

A MAGNETIC CRANE

sembly install a ¾-inch strip to the top of the upright and extend it down to the hoist track as depicted in the diagrams.

Screweyes form the simple hinge arrangement for attaching the boom to the crane tower. Two large finishing nails which have been cut down to stubs serve as pins for the hinges. Before attaching the boom to the tower the boom crosspiece and lever bar should be installed. These provide the boom's swinging motion. Complete the crane by making the pulley car and winch. Ordinary thread spools serve as pulleys. To make the pulley car you will need two window shade roller hooks. Bend them flat in the manner shown and install a spacer bar made from a strip of brass soldered in position. Spools cut ¼-inch from the end flange serve as hoist car wheels and are assembled to the curtain hangers with machine bolts. For the hoist pulley a spool is used intact and bolted to a simple hand crank arrangement. Complete the crane by painting it aluminum trimmed with red.





Above photo shows completed hoist car. This rolls on boom tracks in a truly realistic manner. Crane is constructed from ¾ by ¾ inch maple strips cut and assembled in manner shown in diagram at left.

Build This Sportsman's Gun Cabinet

by Ludwig Depose

Involving only simple construction this handy gun cabinet makes an attractive piece of furniture that will be welcomed by all sportsmen.

RESEMBLING the familiar Grandfather's Clock, this attractive cabinet serves as a unique cabinet for the sportsman's gun and fly rod collection. The cabinet is constructed from inexpensive 10-inch shelving cut to the dimensions given at left. Although the completed cabinet has a professional touch only the simplest type of construction is involved.

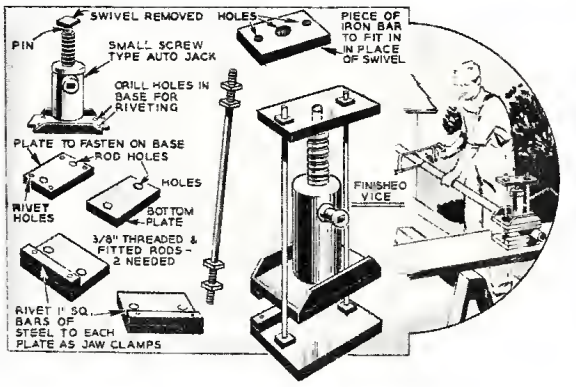
The sides and back of the cabinet are of ⅞-inch stock. The door consists of a frame built from 1x1½-inch material assembled with dowels. Quarter round moulding holds the glass in place. A rack 20 inches from the top of the cabinet holds the firearms in position while strips in the bottom provide the necessary separation for the gun stocks.

A drawer in the bottom of the cabinet provides an ideal place for storing rods, reels, gun bluing and lubricating oils. The front of the door although simply designed provides a very neat effect.

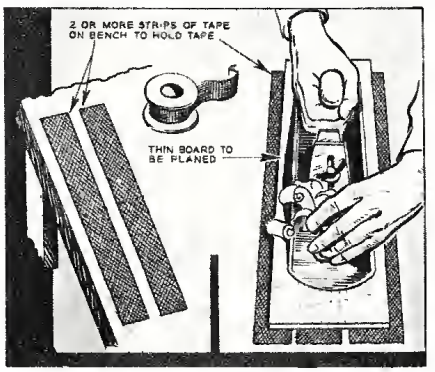
The gun cabinet is constructed from white pine shelving 10 inches wide. For rigid construction all joints should be assembled with dowels and glued securely. Plate glass is held in door with ¼ round moulding.

NEW STUNTS FOR HANDY MEN

Vise Built From Auto Jack


SWIVEL REMOVED
HOLES
PIECE OF IRON BAR TO FIT IN PLACE OF SWIVEL
PIN
SMALL SCREW TYPE AUTO JACK
DRILL HOLES IN BASE FOR RIVETING
PLATE TO FASTEN ON BASE
ROD HOLES
HOLES
RIVET HOLES
BOTTOM PLATE
3/8" THREADED & FITTED RODS - 2 NEEDED
FINISHED VICE
RIVET 1" SQ. BARS OF STEEL TO EACH PLATE AS JAW CLAMPS

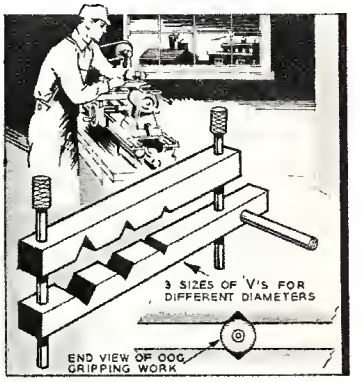
A POWERFUL vise suitable for clamping heavy pipes for cutting can be built from any screw type auto jack. The swivel axle support is removed and the screw mounted on a length of steel plate. A piece of iron or steel plate the same size as the base of the jack is also needed. Fit this and bottom of jack with two knurled bars to serve as the vise jaws. Assemble the unit as shown using two rods, threaded at each end, as tie bars. Mounted on a rigid support the vise is ready for use.



Adhesive Aids Planing Thin Boards

THIN boards or veneering which are not of sufficient thickness to be clamped in the bench vise or rested against the end stop can be held in position with strips of adhesive tape which have been glued to the workbench with the gummed surface up. To plane a thin board it is only necessary to press it firmly on the adhesive surface and proceed in the usual manner. While the adhesive may stick to the board in warm weather any particles that remain on the wood can be quickly removed with a cloth moistened with gasoline.—A. Belmont, Greenwich, Conn.

"V" Shaped Lathe Dog Simplifies Work



WHERE odd shaped objects are to be turned down on a metal lathe this unique lathe dog will permit it to be securely locked in dead-center without any danger of the surface being damaged. Two metal bars are slotted with "V" grooves, each having a different angle to take metal turnings of varied sizes and shapes. Holes are provided in each end of the bars for the clamp bolts. These bolts can be standard machine sizes or they can be threaded to suit the taps in the lower bar. The holes in the upper bar are made sufficiently large to pass the bolts without any friction.—D. W. Prince, Quincy, Mass.

SEAMLESS HOOK OILER SPROUT
STRAP IRON HANDLE
HOLE CUT
SCRAPS OF SOLDER KEPT INSIDE SPROUT
POINT IS HELD WHERE SOLDER IS WANTED

Oil Can Spout Handy Solder Dispenser

WHERE solder must be flowed into some obscure corner difficult to reach with a blow torch this simple spout dispenser will solve the problem in a hurry. Remove the top from a small oil can and attach it to a strap iron handle. A hole drilled in the end of the handle will permit the spout to be inserted without bother.

To use the solder dispenser flow solder into the spout and allow it to harden. When you are ready to solder the elusive joint place the spout directly over the spot to be soldered and apply the blow torch flame.—N. Giacomo, Port Chester, N. Y.

NOVEL TURNED

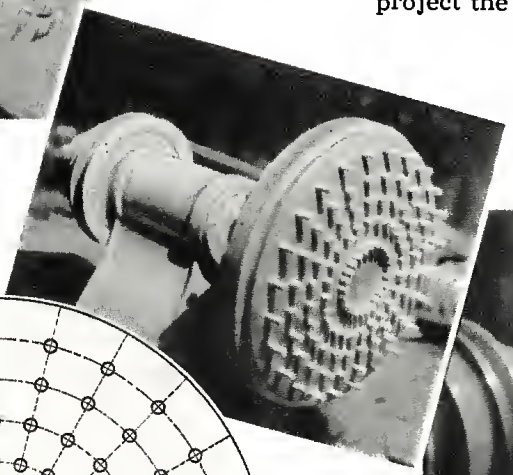
by Dale R. Van Horn

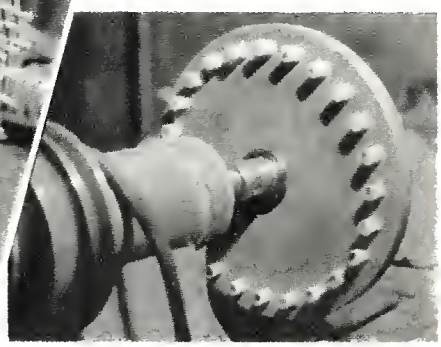
HERE are two interesting lathe projects which are not only easy to build, but which can be made to serve useful purposes. Every housewife has occasion to use a hot dish mat at some time or other to protect the dining table from damage. The dish holder about to be described, is superior in every way to the usual asbestos type, and can be turned on the workshop lathe at a cost not exceeding ten cents. After successfully completing the dish holder a more elaborate project in the form of a handy footstool can be undertaken. Like the dish holder, only simple craftsmanship is involved in order to secure a neat job.

To make the hot dish mat, secure a piece of scrap wood sufficiently large enough to permit it to be turned down to a diameter of 8 inches. For a neat project the block should not exceed 1¼ inches in thickness. Before turning the block round plot off the spaces for the dowel supports. One side of the block is

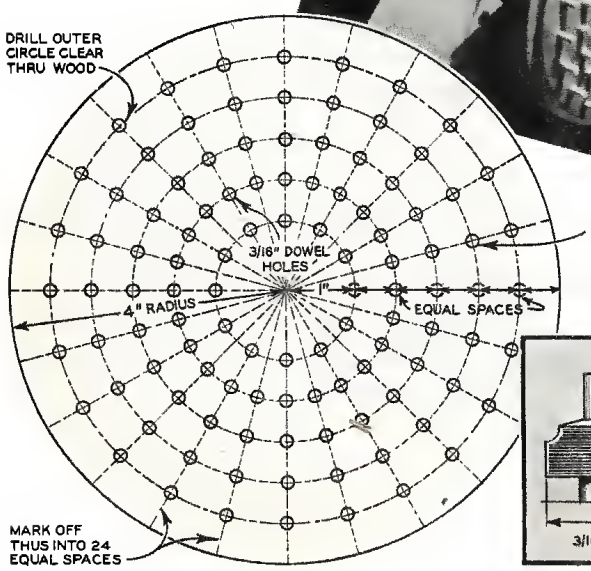
Completed pin and block hot dish mat. Note how mat holds erticles well above its surfece, permitting free circulstion of eir underneath. It is ideel for general use.

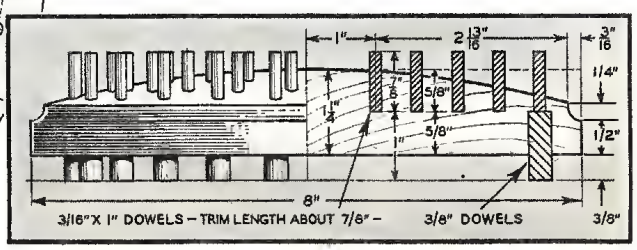
Merk the circles on block and strike off the pin locations with a straightedge or rule, following the layout of the met given et bottom of this pege for dimensions.



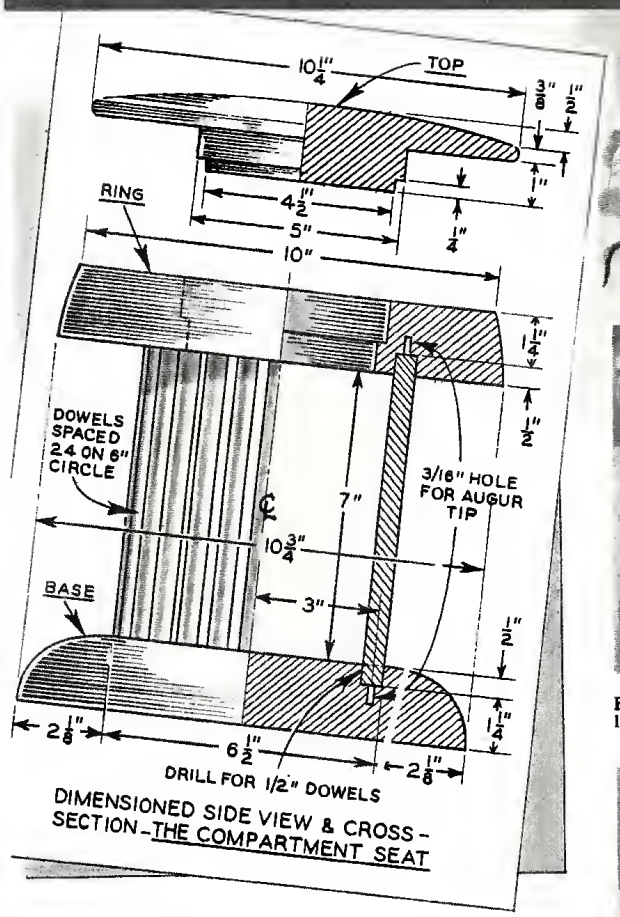


The two pictures ebove show upper and lower sides of the mat after the dowel pins have been sended down to uniform length.





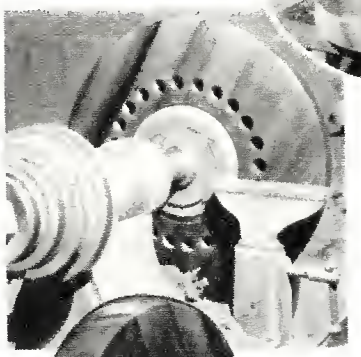
WOOD PROJECTS



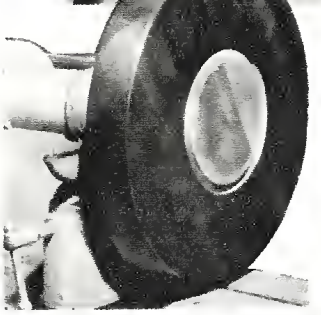
DIMENSIONED SIDE VIEW & CROSS-SECTION—THE COMPARTMENT SEAT

Completed compartment seat is of dignified, substentiel design end makes an attractive eddition to your living room. Smoking equipment, knitting, and so forth mey be stored inside.

Follow the drawings at left end on next page.



After drilling the 3/16" holes in ring and base blocks, enlerge them with the half-inch augur bit to half-inch depth, as shown ebove. Two views of ring, reedy to be cut free, eppear et the left. Note center has not been finished beceuse it will later be cut entirely out.



Right—This view of the upper side of the completed base affords an excellent idea of its appearance efter the finishing end waxing prior to essembling it.

divided into five circles each being 1 inch smaller than the preceding one. Mark off the outside circle into 24 equal spaces and project a line from each division to the center of the block. On the reverse or bottom side of the block layout the hole locations for the feet. These are 3/8-inch dowels of which 12 will be required although 24 can be used if desired.

With the plotting of the dowel holes completed the block can be placed in the lathe and turned down to size and shape indicated in the cross-section plan on page 104. With the turning finished, drill out the holes for the top and bottom pins and glue into place. When thoroughly dry the dish holder can be finished by staining and shellacing. A check-up on materials will reveal that the only cost was for the dowel pins

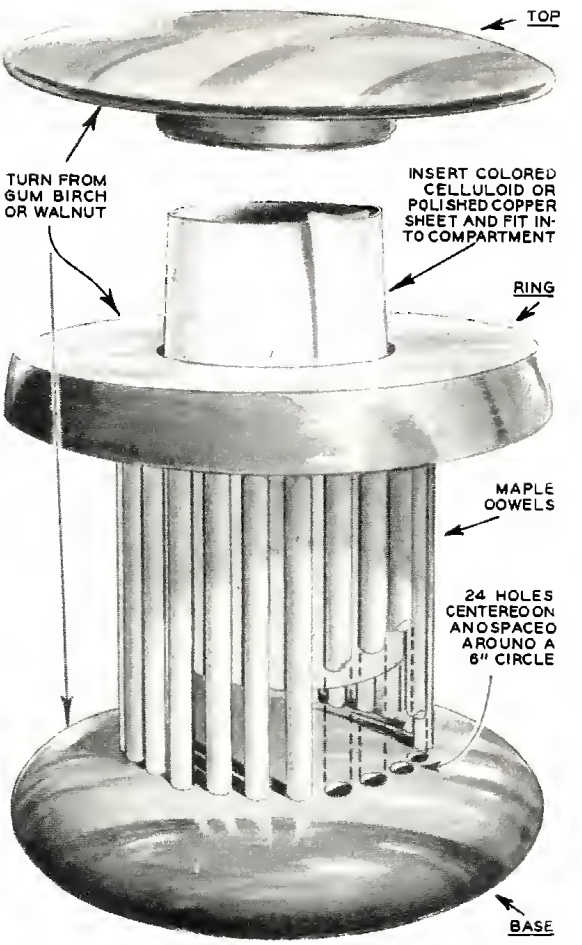
which were cut from two maple dowel rods each costing five cents.

After completing the hot dish holder the craftsman is ready to tackle a more advanced project such as the compartment seat illustrated on the preceding page. So far as actual construction is concerned it involves no more difficulties than the dish holder except that more time is required to construct it.

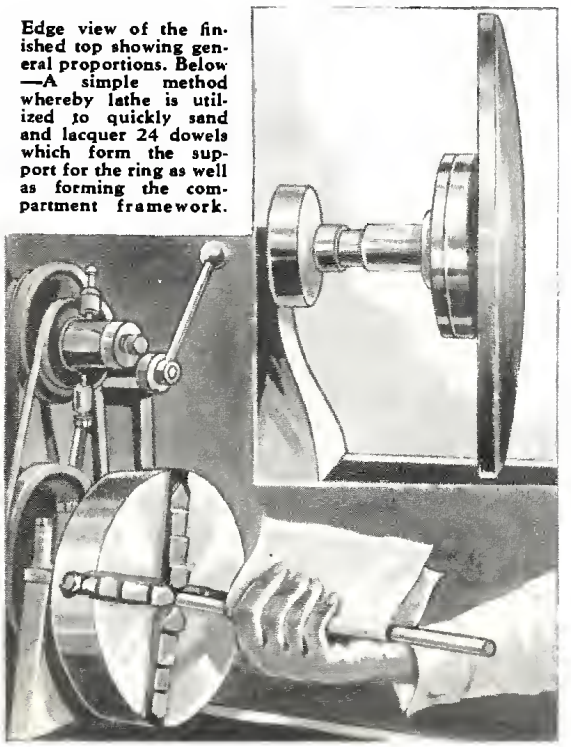
Following the same procedure as in the making of the dish holder, lay out the dowel holes on the top and bottom pieces before turning them to size on the lathe. To accomplish this draw a 6-inch circle and divide it into 24 equal divisions. Walnut, cherry or any other available stock may be used for making the top and bottom of the compartment seat. After fastening the bottom block securely to the headstock of the lathe turn down the 1¾-inch block to the shape shown on the accompanying cross section diagram.

After turning the base it should be waxed lightly with the lathe turning at a moderate speed if a natural finish is desired. To bring out the grain the base can first be stained in a natural color.

Now comes the only difficult part of the seat's construction. The top, it will be noted, is provided with a lid so that when the project has been completed the inner section of the dowel assembly serves as a compartment for holding knitting or small articles. In turning out the top, first shape and finish the top and edge then make a partial cut from both sides for the lid opening. Complete the cut-off by operating the lathe at its lowest speed using a parting chisel for your cutting tool. If the opening is at all rough when the sections are separated it can be sanded smooth. Before making the opening cut, the top is finished with wax in the same manner as was the bottom.


TOP
TURN FROM GUM BIRCH OR WALNUT
INSERT COLORED CELLULOID OR POLISHED COPPER SHEET AND FIT INTO COMPARTMENT
RING
MAPLE DOWELS
24 HOLES CENTERED ON AND SPACED AROUND A 6" CIRCLE
BASE

The component parts of the seat are clearly shown in this drawing. Note how the compartment can be made dustproof by inserting a lining of heavy celluloid or polished copper sheet. A coat of lacquer will preserve the polished finish.

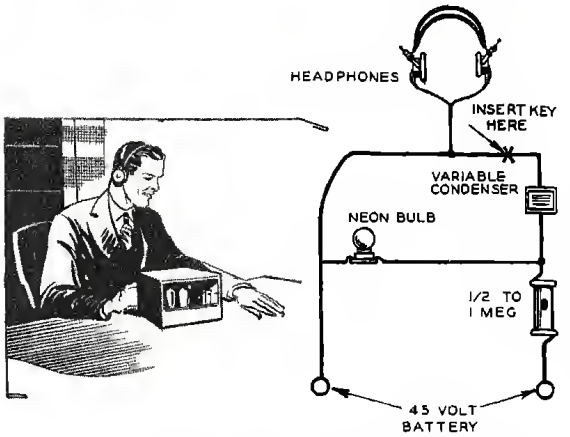


Edge view of the finished top showing general proportions. Below —A simple method whereby lathe is utilized to quickly sand and lacquer 24 dowels which form the support for the ring as well as forming the compartment framework.

Finally, turn the lid to shape so that it fits snugly into the seat opening. The top is turned according to the cross-section plan and wax finished while still on the lathe.

Assemble the stool by drilling out the 24 ½-inch holes in the top and bottom pieces and inserting 8-inch lengths of dowel rod securely gluing each rod in place and finished with a coat of clear lacquer. The compartment is completed except for inserting a sheet of colored celluloid or polished copper to provide a novel decorative effect.

Neon Bulb Operates Simple Oscillator



This handy neon bulb oscillator, constructed at practically no cost, makes a valuable piece of equipment for the radio experimenter's workbench. It can be used for code practice work.

A CODE practice oscillator that will make a valuable addition to the radio experimenter's workbench can be constructed with a minimum number of parts all readily obtainable from any radio parts supply house. The oscillator can be built on a small plywood base or, if an especially neat job is desired, in a small wooden or bakelite case.

A .00035 mfd. variable condenser, small neon lamp and a 500,000 or 1 meg. ohm resistance completes the list of parts. Wire up the oscillator according to the schematic diagram with fahnstock clips or binding posts installed on the base for connecting the 45-volt B battery and earphones.

To use the oscillator connect it to the B battery and headphones and place it near a radio receiving set. For code practice a key can be inserted in series with earphone leads.

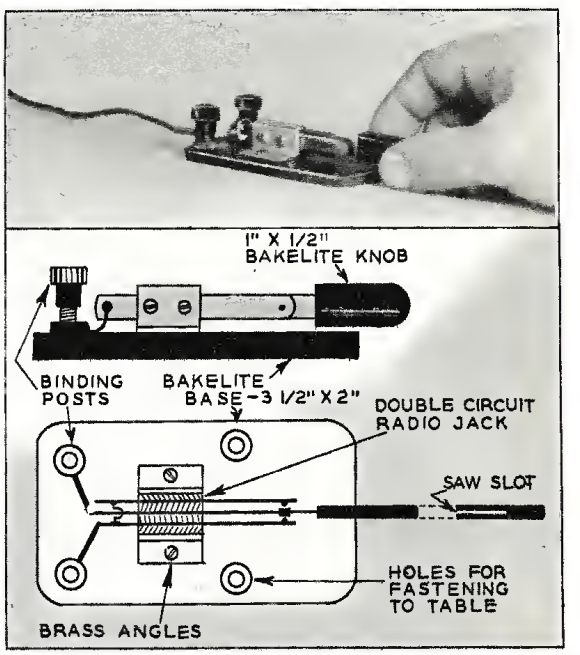
Jack Forms Hi-Speed Key

A DOUBLE circuit jack plug salvaged from a radio of ancient vintage can be transformed, with a little work, into a high speed navy or "bug" type telegraph key. Unlike the usual device with which everyone is familiar, this key is fitted with double contacts and operated with a horizontal instead of vertical movement.

After securing a suitable jack remove the brass mounting bracket and all but the three center contacts. Mount these on a piece of bakelite or hard rubber radio panel with a pair of brass brackets. Wire up the two outside contacts and connect them to one of the two binding post terminals. The center contact is then connected to the remaining post completing the wiring operation.

A bakelite handle similar to those used on inexpensive knife switches is secured and slotted to take a thin, but rigid, brass strip. Solder the brass extension to the end of the middle contact and your key is completed.

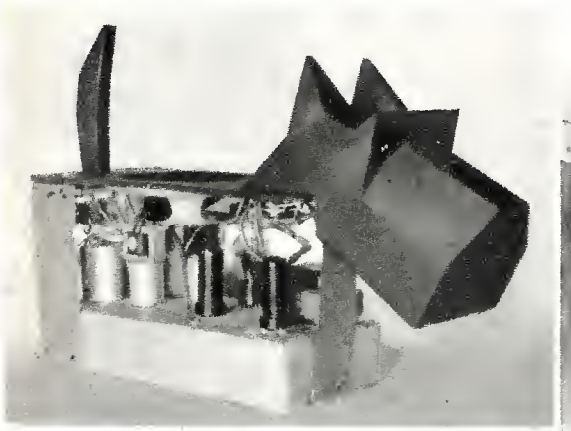
By adding a pair of adjustment screws key can be adjusted to the builder's touch.

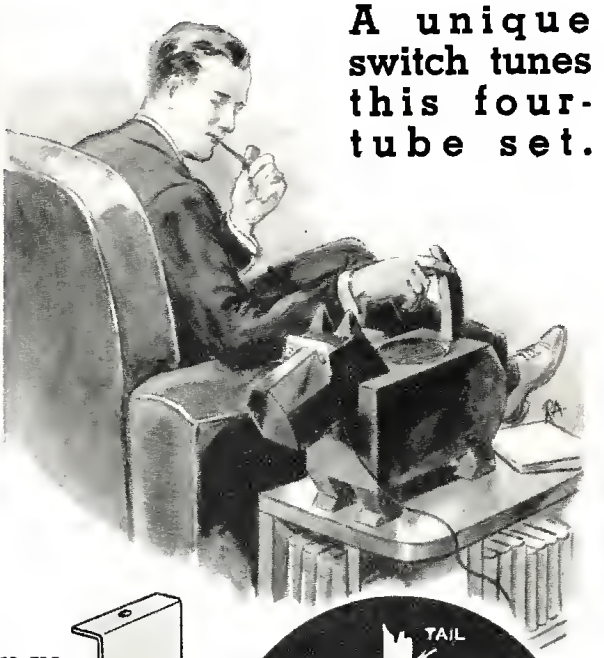


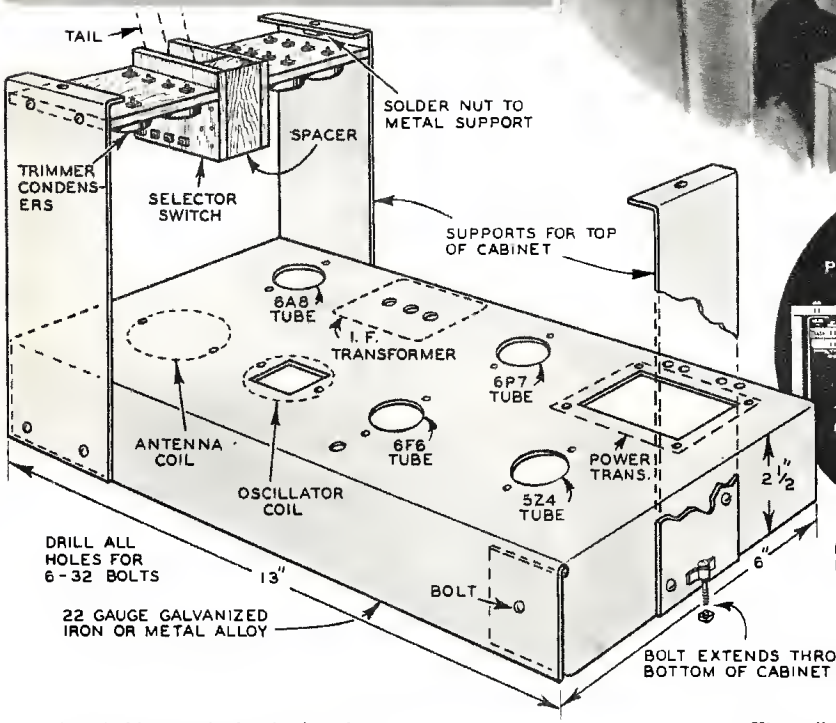
This high speed "bug" key was fashioned from double circuit radio jack such as used in early radio receivers. Mounted on a bakelite base fitted with terminals it presents a neat appearance.

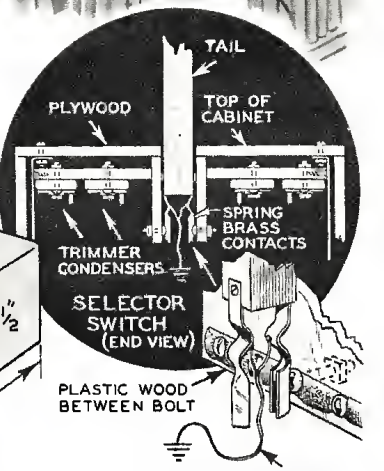
NOVEL "SCOTTIE DOG" RADIO

A unique switch tunes this four-tube set.









A suitable metal chassis for the "Scottie" set can be formed from No. 22 galvanized iron or a cake tin of a similar size can be employed.

The tail switch mechanism is shown above. Brass bolts serve as contacts for the wipers. Plastic wood between screws provides easy switch movement.

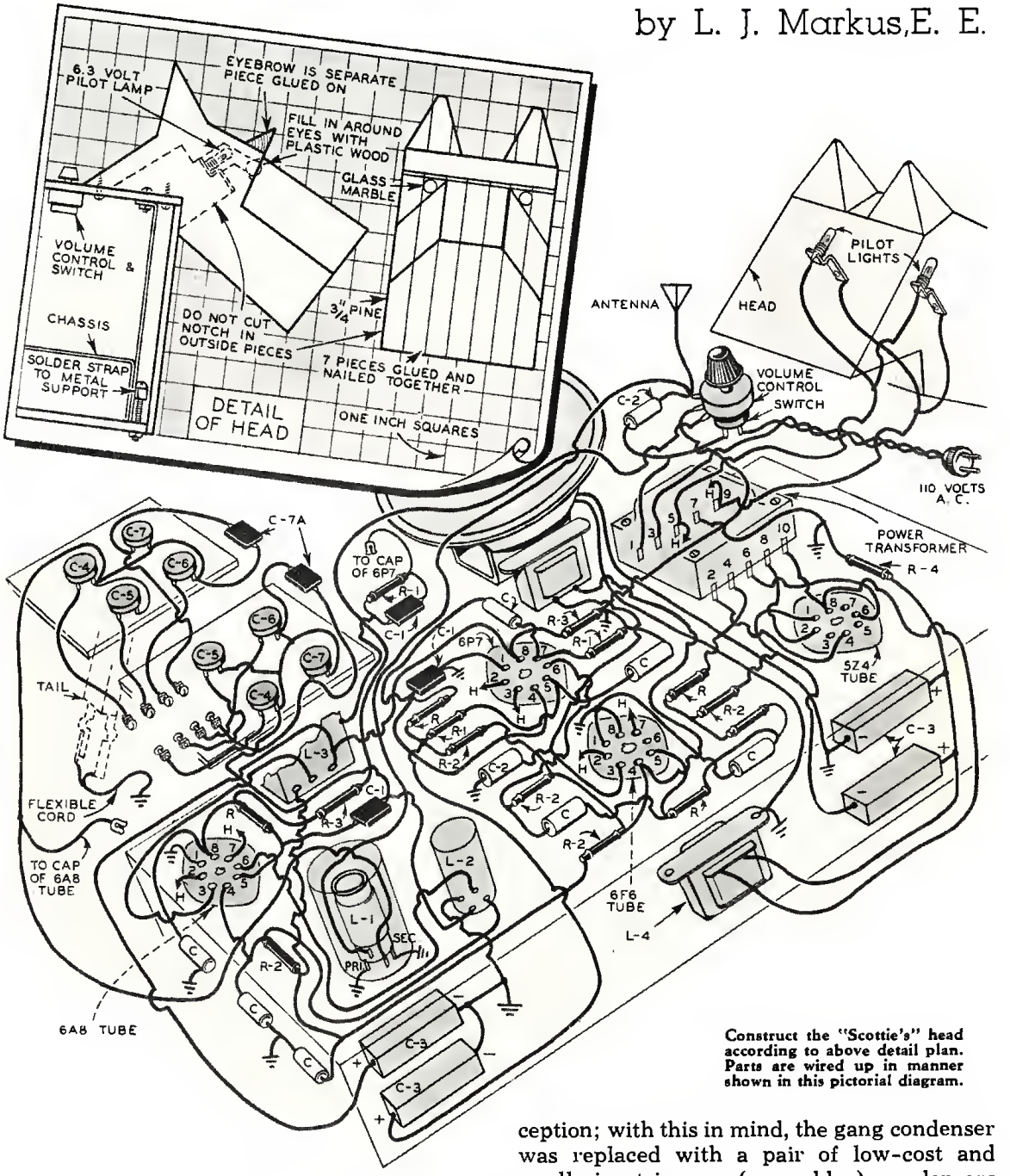
MEET "Scottie," the world's first radiofied dog! Turn that knob just back of his head and watch his cheery brown eyes light up in greeting; wait a few moments and lo! Scottie begins to sing. Tweak his tail a little and he talks for you; tweak it another notch and you get orchestra music; one more tail flip and you'll hear—well, your guess is as good as ours. Anyway, Scottie is a four-tube superheterodyne radio receiver built into the very latest of modernistic cabinets, ready to entertain you and your friends in living room, den or playroom.

Pilot lights mounted behind glass marbles provide the cheery twinkle in his eyes when the power switch is on. The switch knob also serves as volume control; the only other control is the tail, which operates the station selector switch.

Four tubes in an ingenious new circuit do the work of six ordinary tubes and give you real superheterodyne performance. The cost of all parts for the receiver will be somewhere around fifteen dollars, perhaps a bit more, depending upon how good a loudspeaker you want. The cabinet will cost little or nothing

TUNED BY WAGGING TAIL

by L. J. Markus, E. E.

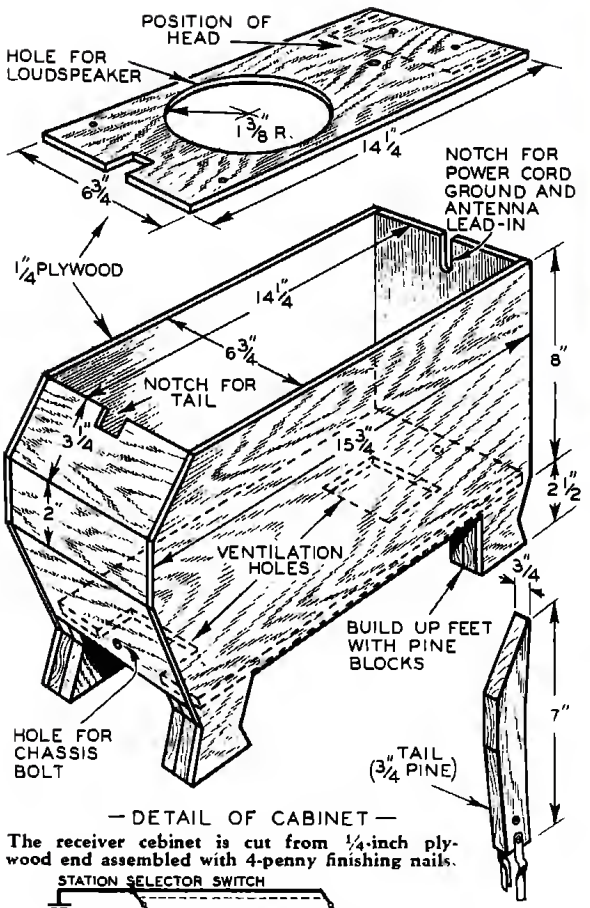


Construct the "Scottie's" head according to above detail plan. Parts are wired up in manner shown in this pictorial diagram.

if you have a home workshop which is stocked with the usual woodworking supplies such as plywood, one-inch white pine and a pint or so of good dull black enamel.

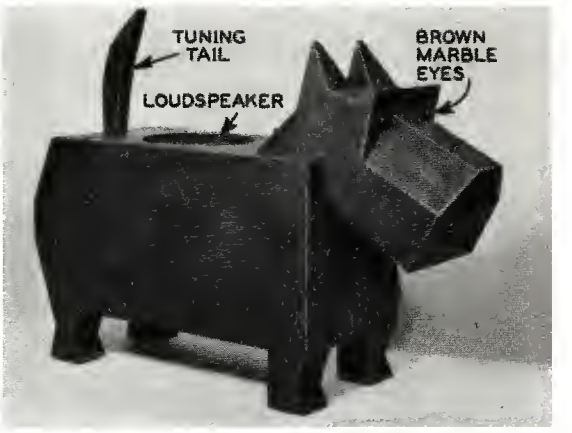
Ordinarily a receiver of this type would use a two-gang tuning condenser. It is a known fact, however, that most owners of midget receivers use them only for local reception; with this in mind, the gang condenser was replaced with a pair of low-cost and small-size trimmer (or padder) condensers for each station desired, one pair of these corresponding to one position of the gang condenser. Three different sizes of trimmers are used, allowing accurate tuning-in of stations spread over the entire broadcast band.

The chassis can be cut from any kind of sheet metal which is 22-gauge or heavier, or



— DETAIL OF CABINET —

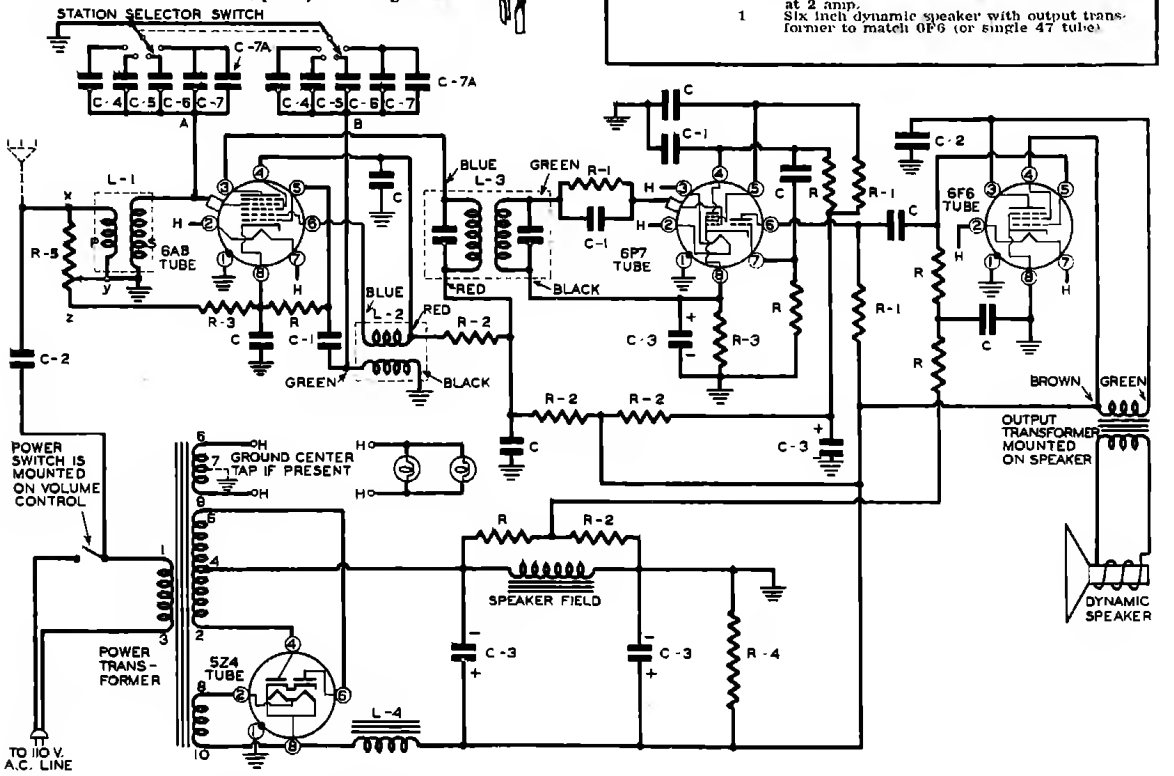
The receiver cebinet is cut from ¼-inch plywood end assembled with 4-penny finishing nails.



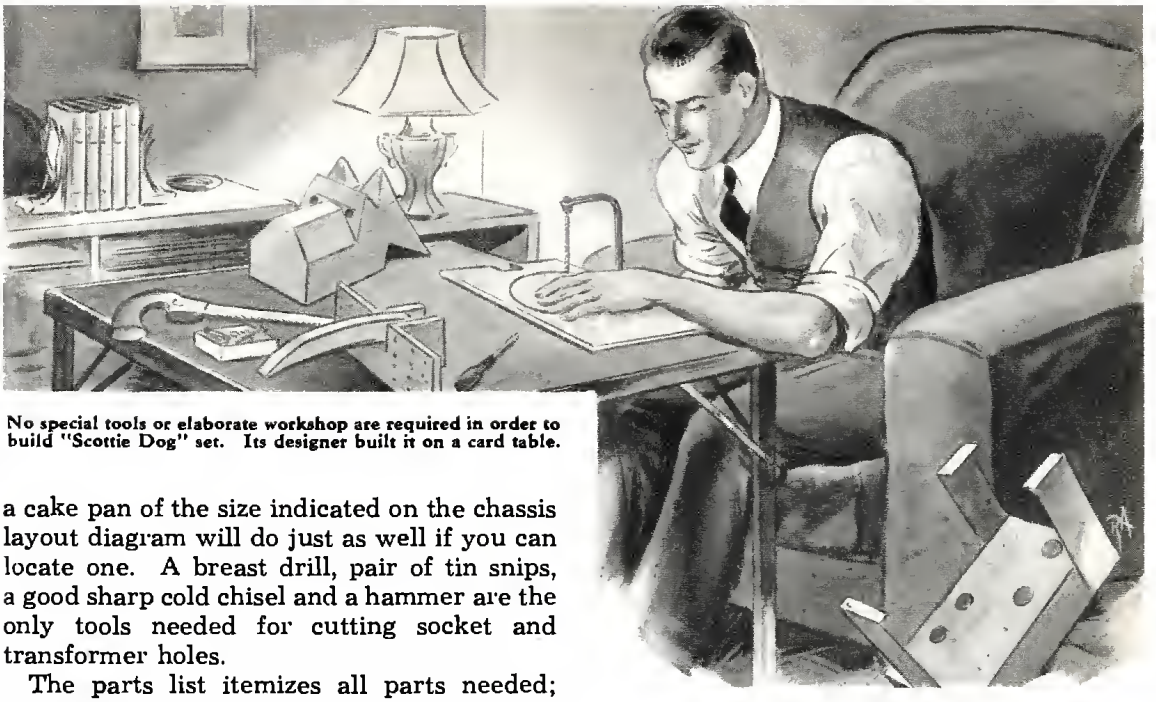
Here is "Scottie" completed and ready to surprise guests with e bit of music instead of e bark. Brown marbles serve es pilot lights.

PARTS LIST—SCOTTIE DOG RADIO

Part	Number Needed	Description
C	7	.1 mfd., 400 volt cartridge condenser
C-1	3	.0005 mfd. mica condenser
C-2	2	.005 mfd., 400 volt cartridge condenser
C-3	4	8 mfd., 400 volt electrolytic condensers
C-4	2	7-80 mmfd. Isolantite padder condenser
C-5 & C-6	4	27-180 mmfd. Isolantite padder condenser
C-7	2	58-325 mmfd. Isolantite padder condenser
C-7A	2	.00005 mfd. mica condenser
R	6	250,000 ohm, 1 watt carbon resistor
R-1	3	500,000 ohm, 1 watt carbon resistor
R-2	4	50,000 ohm, 1 watt carbon resistor
R-3	2	300 ohm, 1 watt carbon resistor
R-4	1	50,000 ohm, 2 watt resistor
R-5	1	10,000 ohm antenna shunt potentiometer
L-1	1	Shielded R. F. antenna coil
L-2	1	Shielded 175 kc. oscillator coil
L-3	1	175 kc. shielded I. F. transformer with tuned primary and tuned secondary
L-4	1	20 henry, 50 ma. filter choke
	1	Flush mount power transformer—650 volt C. T. at 45 ma., 6.3 volts at 2 amp., 5 volts at 2 amp.
	1	Six inch dynamic speaker with output transformer to match 6F6 (or single 47 tube)



The circuit shown here corresponds with the pictoriel diagrem on pege 109. The values of the various parts are given in the parts list shown at upper right. Trimmer condensers previously adjusted to four stations permit station selection.



No special tools or elaborate workshop are required in order to build "Scottie Dog" set. Its designer built it on a card table.

a cake pan of the size indicated on the chassis layout diagram will do just as well if you can locate one. A breast drill, pair of tin snips, a good sharp cold chisel and a hammer are the only tools needed for cutting socket and transformer holes.

The parts list itemizes all parts needed; these are mounted on the chassis in the positions indicated on the diagrams, then connected together, using the shortest leads possible which will clear other leads and terminals by at least one-fourth inch. Solder all connections securely, using rosin core solder.

Note that there are no connections beneath the chassis for the antenna coil; two of its terminals are grounded, and leads for the other two are run out through holes drilled in the top of the shield before the coil is mounted on the chassis.

With all parts arranged exactly as shown, the type of speaker used fits over the chassis with ample clearance; if there is any doubt about this, determine the best position for your speaker, rearranging parts a little if necessary to secure the necessary room. If a larger speaker is used it may be necessary to increase the size of the cabinet a little; this is quite permissible.

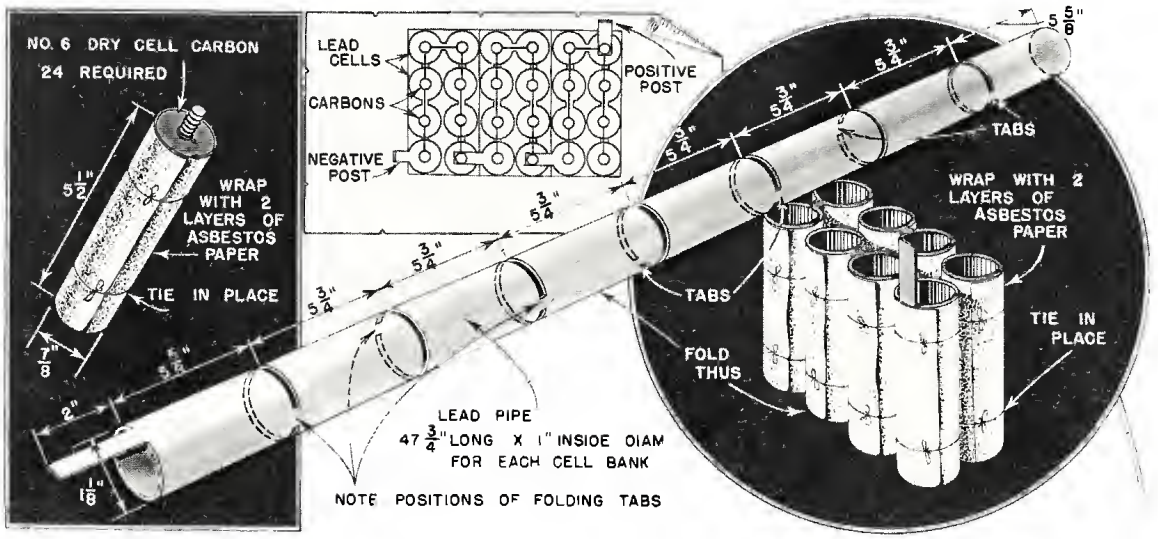
The station selector assembly, loudspeaker and volume control are all mounted beneath the top of the cabinet, connections to these parts being made with flexible insulated wire. The dog's head is attached to the cabinet top after the pilot lights are put in. The four pairs of trimmer condensers are mounted on quarter-inch plywood on either side of the simple, easily made selector switch. Two contact arms cut from spring brass (such as a flattened-out Fahenstock clip) are mounted one on either side of the lower end of the tail, using a single bolt (since the two arms are connected together and to ground). These arms swing over four pairs of V-notched bolts which are placed on vertical pieces of plywood on either side of the tail. Ordinary 6-32 round head machine screws are used, the groove in the head being changed to a V with a small three-cornered file. Changing the position of the tail thus grounds a terminal of one condenser on each side of the tail at a time. By rearranging the trimmers a bit, a 11-pole double throw rotary switch, available from radio supply houses, can be used in place of this homemade switch.

The two electrolytic condensers in the filter circuit are located quite near the power transformer, and should therefore be held off from the chassis by quarter-inch strips of plywood, to prevent damage from heat given off the transformer and rectifier tube.

No antenna is required for local reception in areas served by powerful transmitters, a condenser connected to the power line serving amply for signal pickup. In practically all cases, however, a ground will be needed: simply attach the ground wire to the chassis at any convenient point. For rural areas, where perhaps only one or two stations come in with sufficient volume, an outdoor aerial should be used; this is attached at the point indicated in the circuit diagram, and the condenser C-2, which goes from this point to one side of the power switch, is removed. Antenna, ground and power cord leads are run out

[*Continued on page* 122]

DOLLAR STORAGE BATTERY REALLY WORKS



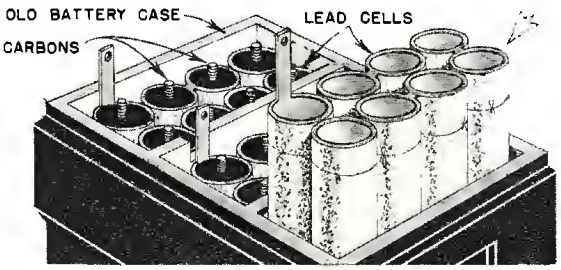
Carbon elements selvaged from useless No. 6 dry cells form the core of the lead cell essembly. The leed jackets are cut from 1⅛" pipe as shown above.

by A. H. Waychoff

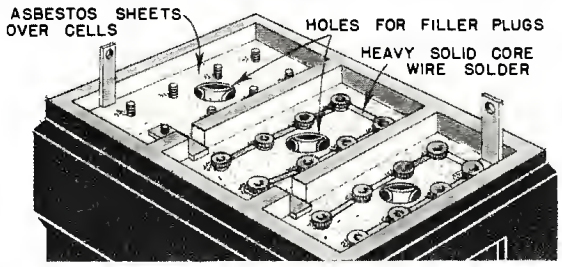
A PRACTICAL storage battery that can be used for any purpose from starting your car to operating a radio receiver can be constructed at a cost not exceeding one dollar. Besides producing a heavier amperage than an ordinary 15-plate battery it has the added advantage of being 40% lighter. It can be charged to full capacity by attaching to an ordinary battery charger over-night.

The battery is constructed from materials available at the nearest junk yard. An old battery case is salvaged from a wrecked car, the contents removed and the case cleaned out with washing powder. Two dozen dead dry cells are procured and the large carbon elements reclaimed by chopping open the zinc cans.

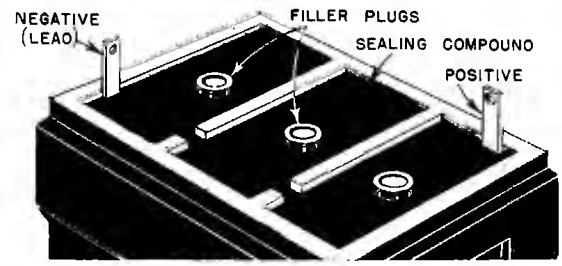
Purchase three four-foot lengths of 1⅛-inch lead pipe and with a hack saw cut it in the manner shown in the above illustration so that the pipe when bent becomes a unique arrangement of eight lead cells. This eliminates difficult soldering of each cell. After the cells have been bent to shape the carbons are next inserted in them. Before inserting the carbons they must first be insulated and to do this wrap each one with two layers of thin asbestos paper. Each of the eight cell units are mounted on fiber panels then wired as indicated in the circuit and mounted in the battery case. Seal the top of the assembly with transformer wax. Fill each of the three cells with 1040° sulphuric acid battery electrolyte and charge overnight.



Eech compertment of the storege bettery cese is fitted with eight cells. Asbestos paper insulates the leed jackets from eech other as pictured here.

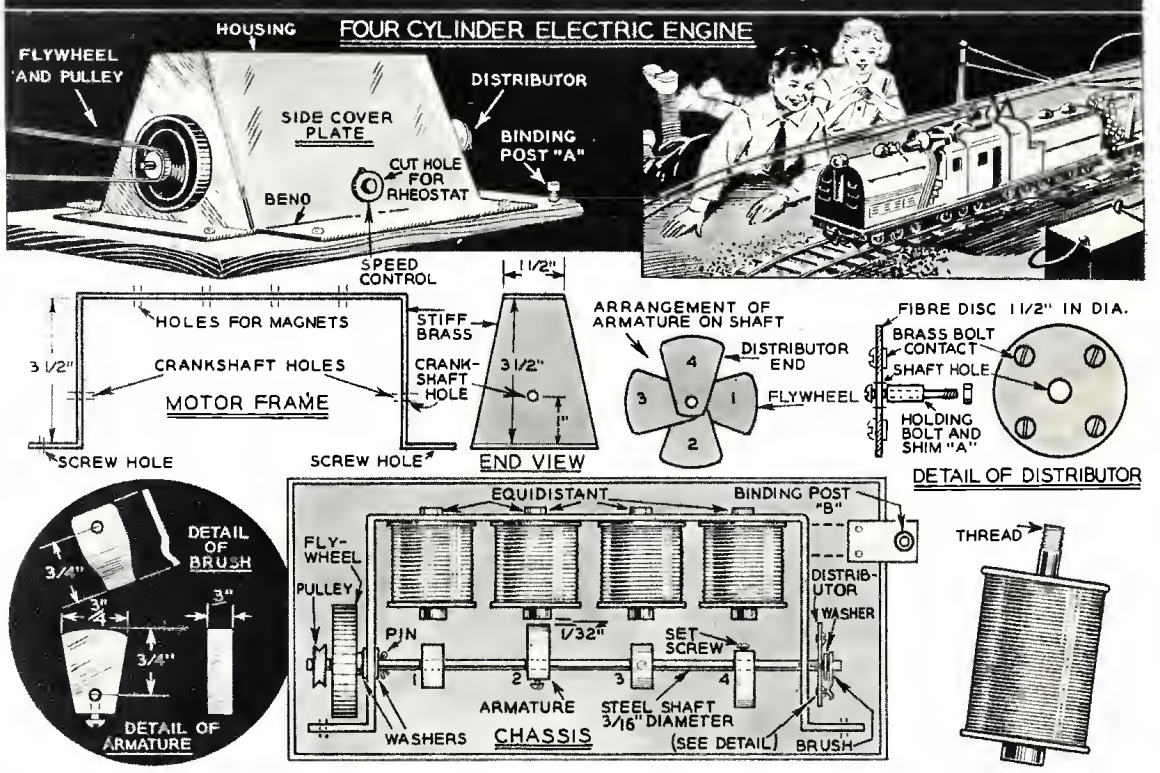


To prevent corrosion heevy leed wire solder is used to connect the cerbon rods. Do not use a core solder. A slot in eech compertment ellows for connecting jumper tabs.



Completed, the top of the cell is sealed with e leyer of transformer wax. Be sure to cut opening in fiber panels to permit insertion of electrolyte; e 1040° sulphuric ecid solution.

BELL MAGNETS RUN TOY ELECTRIC MOTOR

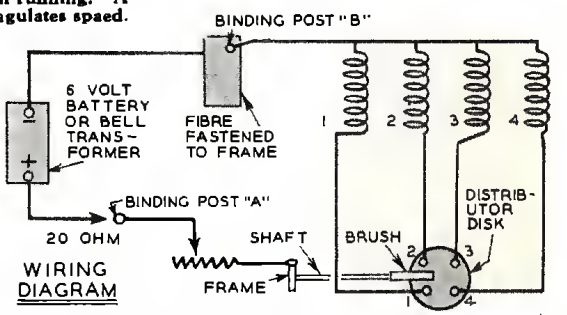


Consisting of four door ball magnats arranged in e uniqua cylinder system this minietura alactric motor is capebla of driving ell kinds of machanical toys et e rapid clip. A larga flywhaal providas for uniform smooth running. A 20-ohm radio rhaostat connacted in saries with motor and battary ragulates spaad.

by Lawrence B. Robbins

A PAIR of door bells or buzzers salvaged from the workshop scrap box or purchased new at a ten-cent store form the nucleus of a powerful toy electric motor that will drive all kinds of models and mechanical toys. Designed so that the magnetic fields operate like the pistons of an automobile, the little motor goes so far as to include a tiny distributor which "fires" one magnet at a time in the same manner as the automobile distributor fires the cylinders.

After securing the necessary materials, which includes besides the magnets some stiff sheet brass or copper, $\frac{3}{16}$-inch diameter steel shafting and a piece of red fiber, you can begin construction. Remove the magnets from the bell cases and thread the ends so that they can be lined up on a brass bracket of the shape and size indicated in the above illustrations. Next cut the armatures from $\frac{3}{8}$-inch iron rod and drill a $\frac{3}{16}$-inch hole in the center of the armatures numbered 1 and 3 and a hole ¼-inch from the end of armatures numbered 2 and 4. The latter armatures are 1 inch long,

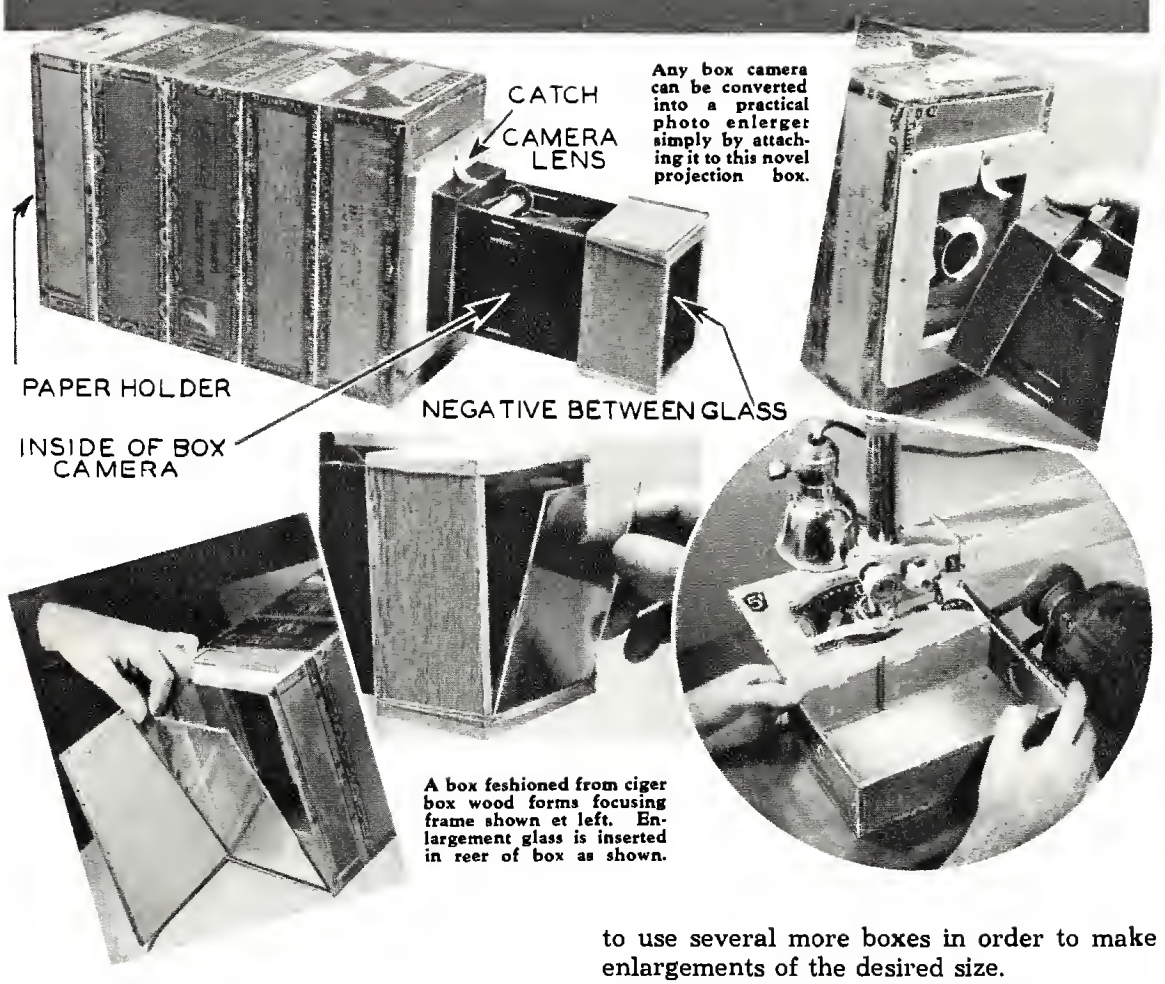


The magnets are wirad up in tha manner shown hara. Each coil indicatas a magnat. A simpla distributor on the end of motor shaft "fires" aach magnat in euto ignition fashion.

while the other two are ¾ inches in length. Attach the armatures to the motor shaft as shown so that when piston 2 is up, piston 4 will be down.

Complete the motor by attaching a cast iron or lead flywheel to one end of the shaft and the distributor to the other. The distributor is simple to construct and care need be exercised only when wiring the magnets to it to insure proper firing order. Cut the distributor from a fiber disc measuring 1½ inches in diameter. Drill holes as shown and insert four flathead brass bolts. Connect up the motor according to the wiring plan.

A CIGAR BOX PHOTO ENLARGER



Any box camera can be converted into a practical photo enlarger simply by attaching it to this novel projection box.

A box feshioned from ciger box wood forms focusing frame shown et left. Enlargement glass is inserted in reer of box as shown.

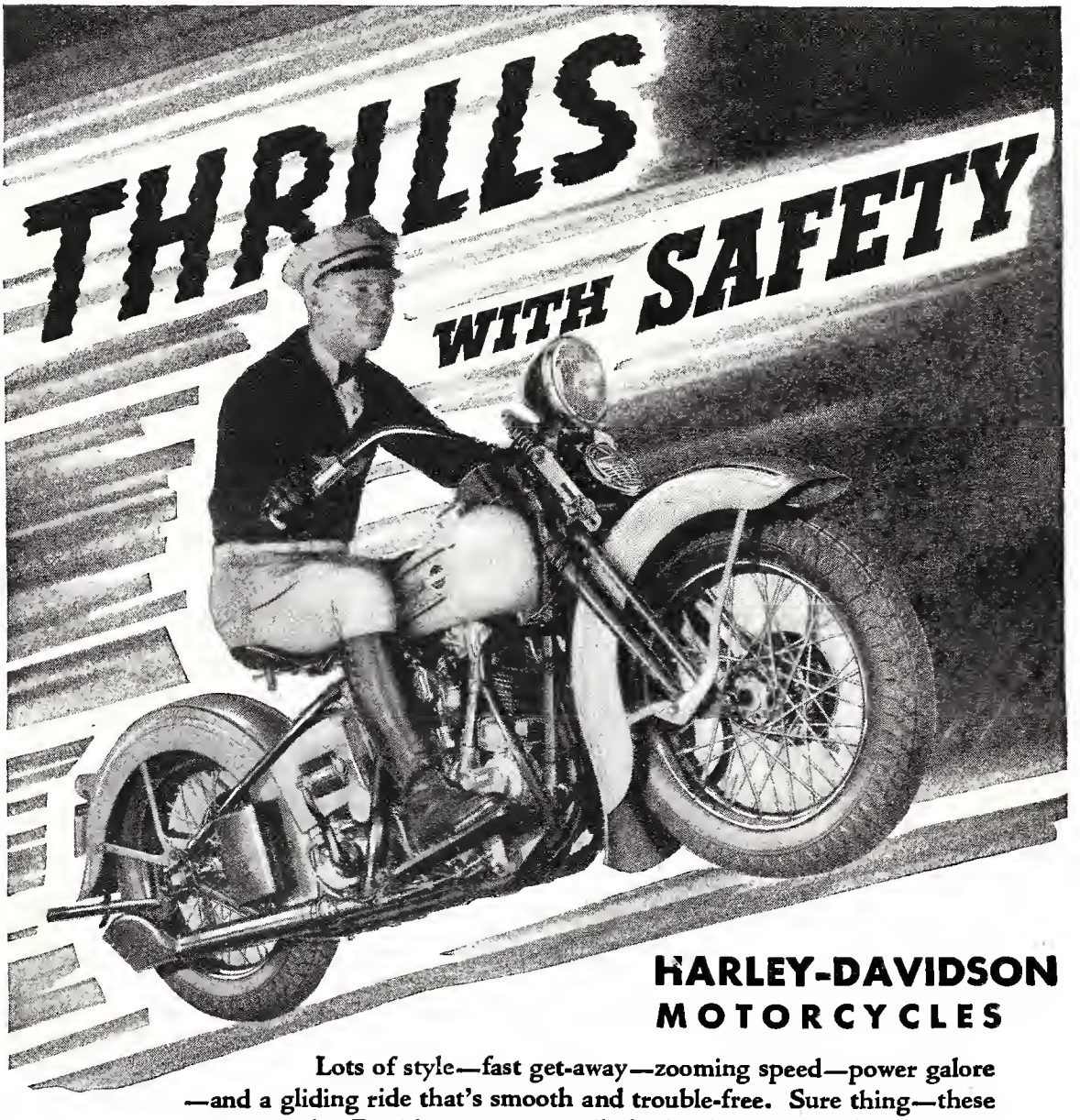
IF YOU use a small box camera, such as the No. 120 or 116, you will find this a cheap but satisfactory enlarger for "blowing up" the negatives to 5x7 or 6x8 inches. Results are equal to those of enlargers costing many dollars. Operation is simple as no focusing is necessary; merely slip a sheet of enlarging paper into the back, face the enlarger to a light source (such as daylight or an electric lamp) and open the shutter.

As can be seen from the illustrations, the inside part of the box camera is used to provide the lens and shutter; as the camera is not altered in any way, it can be used interchangeably for both taking and enlarging the pictures. For the popular No. 120 size camera a focal distance of about 12 inches between lens and enlarging paper is required so five ordinary size cigar boxes are used. The No. 116 camera will make it necessary to use several more boxes in order to make enlargements of the desired size.

The drawing shows how the boxes are nailed and glued together to make a light-tight chamber after sawing out the centers of bottoms and lids. This can be done with a hand scroll saw, or if a power saw is used a saber blade and lift the upper chuck and blade guide out of the way. When the job is finished, give all interior parts a coat of blackboard paint to kill reflections. The outside may be painted or enameled if appearance is a consideration.

To the front glue a board with center removed to receive the front part of the camera, as the photographs indicate. It will be noticed that a bent piece of spring brass is used to lock the camera in place. The negative holder slips over the other end of the camera and consists of a cigar-box wood frame. Two pieces of glass are fitted in one side, with the negative between and held in place with rubber bands at top and bottom.

[*Continued on page* 120]



HARLEY-DAVIDSON MOTORCYCLES

Lots of style—fast get-away—zooming speed—power galore—and a gliding ride that's smooth and trouble-free. Sure thing—these streamlined 1937 Harley-Davidsons are ruggedly built—have perfect balance—instant response of power when driving conditions demand—and dependable brakes both front and rear for quick, easy stops. . . Yes, plenty of thrills—go where you will—get there quickly, safely and economically in the saddle of a 1937 Harley-Davidson. . . See your nearest Harley-Davidson Dealer RIGHT AWAY. Take a FREE ride on a 1937 Harley-Davidson — ask about his Easy Pay Plans. And send in the coupon.

Ride a —

HARLEY-DAVIDSON

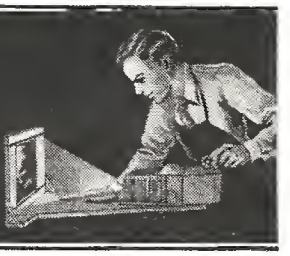
HARLEY-DAVIDSON MOTOR CO.
Dept. MM, Milwaukee, Wis.
Send illustrated literature. Postage stamp is enclosed to cover mailing cost.
Interested in motorcycling.

Name .....

Address .....

My age is ☐ 16-19 years, ☐ 20-30 years, ☐ 31 years and up, ☐ under 16 years.
Check your age group.

AMATEUR PHOTO PUZZLERS



In this department the Photography Editor will answer any question or problem related to cameras of all types, enlarging, printing, developing, taking pictures, and the various phases of home movie making. When sending questions to this department, be sure to include a stamped, addressed envelope in case space does not permit publication of the question and reply on this page. Send all inquiries to the Photography Editor, Modern Mechanix, *22 West Putnam Avenue, Greenwich, Connecticut.*

TAKING PICTURES OF DISTANT OBJECTS

On several occasions I have attempted to take snapshot pictures of a mountain located just a few miles from our home. In each instance the pictures when developed show a haze making them unsuitable for my needs. Can you suggest a way to correct this trouble?—Kent Worthington, Reiffton, Pa.

Your difficulties are due to atmospheric haze composed of minute particles of moisture causing portions of the picture to be veiled. By using a panchromatic film with a yellow filter attached to the lens of your camera the haze can be prevented to a certain extent.

TAKING OUTDOOR SILHOUETTE PICTURES

I have often desired to take outdoor silhouette snapshots, but do not know exactly how to proceed. Can you tell me how this type of picture is made?—John Blakely, Windsor, Ontario.

To take outdoor silhouette snapshots the subject to be photographed should pose on a rise of ground toward the west just when the sun is near the horizon and the glare obscured by clouds. The snapshot should be taken with the lens opening adjusted to medium.

NIGHT ACTION PICTURES WITH BOX CAMERA

How can I take action pictures of a night hockey game with my vest-pocket camera? This camera is one of the inexpensive type using No. 127 film.—Wallace Jones, Cleveland, Ohio.

You cannot take night action pictures with this type of camera since it is not fitted with the proper type of lens. A camera that will take night action pictures must be fitted with a very fast lens. Cameras of this type are rather expensive.

PURPOSE OF FINE GRAIN DEVELOPERS

On many occasions I come across literature mentioning the use of a fine grain developer. In what instances do you use a solution containing fine grain powders?—Dorothy Jordan, Grand Rapids, Mich.

Fine grain developers are intended for use with fine grain films. The popular candid cameras using 35 mm. movie film in nearly every instance use a fine grain film. This film permits the negative to be enlarged without small speckles appearing on the finished picture. On ordinary contact prints there is no advantage in using a fine grain film.

DULL OR GLOSSY FINISHED PRINTS?

For ordinary photo work which printing paper produces the best prints, dull or glossy finished? Just having started this interesting hobby there are problems such as this one that puzzle me. Your advice would be appreciated.—Richard Hayes, Syracuse, New York.

For making small contact prints, that is prints made directly from the negative and not enlarged, a glossy paper is suggested since details show up clearer. On enlargements a matte paper is used for best results. This has a dull or semi-dull finish.

PHOTO ODDITIES

By aiming the camera lens at the chrome hub cap on his car, F. Warren of Ottawa, Ont., secured the unusual picture shown at top. He receives this month's $5 award. The lower photo earned for H. C. Dixon, Johnstown, Pa., the $3 photo award. The girl in the palm of the hand was superimposed on the photo.

DEVELOPED FILMS SHOW DISCOLORATION

On numerous occasions my home-developed films show uneven discolorations. Sometimes the color is green and other times red or pink. Can you tell me the cause of this tone and how it can be corrected?—Lavern Stevens, Minneapolis, Minn.

Some film is manufactured with a red colored backing while other film is provided with green colored backings to help prevent halation or a spreading of light around bright parts of the subject when taking pictures toward the light. The tones will practically disappear when films are properly developed in a fresh acid fixing bath. The uneven color can be removed by placing in a 5% solution of sodium sulphite and then rewashing films.

PHOTOFLOOD BULBS FURNISH LIGHT FOR NIGHT PICTURES

In taking pictures at night how can I be assured of results when using Photoflood bulbs? Can you tell me how much light I can expect from lamps of this type?—Raymond Francis, Salt Lake City, Utah.

Photoflood bulbs insure satisfactory night pictures if two or more bulbs are used with the correct exposure. The No. 1 Photoflood bulb produces illumination equal to that of a 750 watt electric bulb or several bulbs whose combined wattage equals 750.

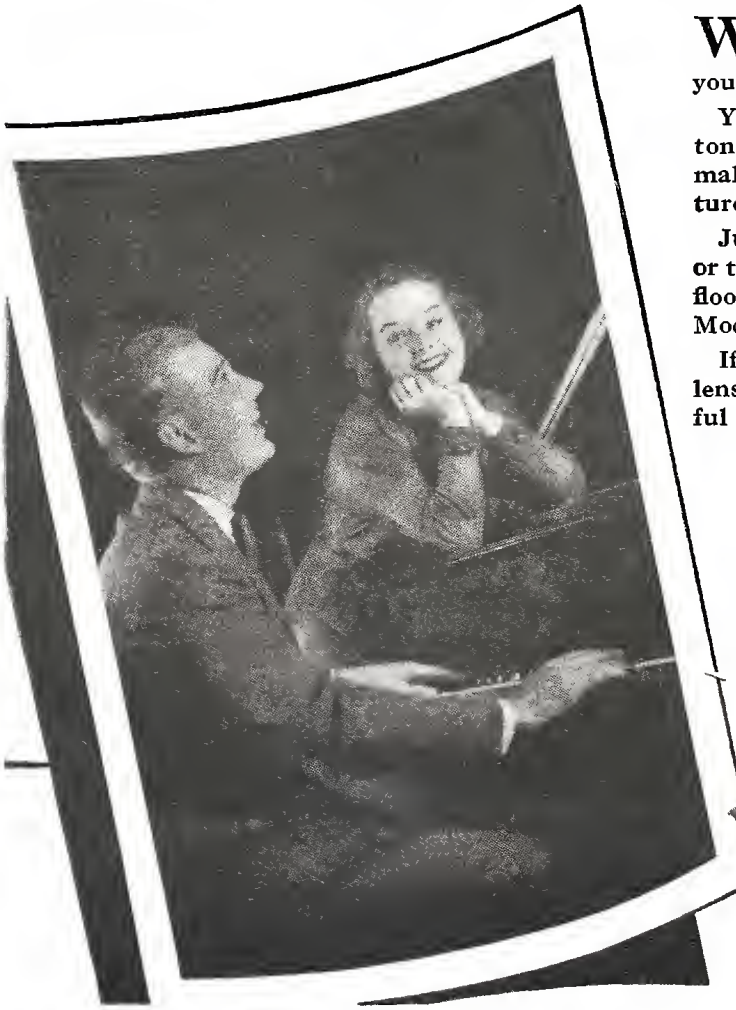
By following the instructions printed on the Photoflood lamp carton you are assured of results. To take snapshot pictures four bulbs will be required unless you wish to use a Photoflash bulb.

The photography editor will pay $5.00 or $3.00 each for photographs interesting enough for publication on this page. All pictures should be mailed to Modern Mechanix Publishing Co., Greenwich, Conn.

1 Kodak "SS" Film in your camera

2 Two or three Photoflood Lamps and Reflectors

Everything you need to make snapshots at NIGHT



WANT to try your hand at indoor snapshots? No need to wait until you get a better camera.

You can start right in snapshooting tonight. For now, even a simple Brownie makes snapshots (instantaneous pictures) indoors after dark.

Just use Kodak "SS" Film, and two or three of the new No. 2 Mazda Photoflood lamps, which last for hours, and Model B Kodak Handy Reflectors.

If your camera has an *f*.6.3 or faster lens, No. 1 Photoflood lamps are powerful enough.

FREE BOOKLET . . . Contains all you need to know about *both kinds* of night pictures—*snapshots* with Photoflood lamps, *fast exposures* with Photoflash lamps. (You can use Photoflash lamps, each good for one picture, if your camera can be set for "time.") The booklet's pictures and diagrams show how to arrange your lights . . . how to place your subject . . . and it even suggests a variety of picture opportunities. Get a copy at your dealer's . . . Eastman Kodak Co., Rochester, N. Y.

Dr. Miller R. Hutchison

[*Continued from page* 61]

Queen Alexandra, whose hearing was impaired. He was given a special gold medal, having on one side a bas-relief of King Edward VII and Queen Alexandra, and on the reverse a bas-relief commemorating their coronation, at which Hutchison attended.

While working on sound instruments for the deaf, Hutchison invented the dictograph. This invention has been of great aid to our Secret Service, and is seen on every hand as a loud-speaking inter-communication system for offices.

He was not quite out of his twenties when his work in accoustics brought forth the Klaxon Horn, of which more than 15,000,000 have been sold. Mark Twain, an old friend, jestingly accused Hutchison of inventing the Klaxon to make people so deaf they would have to buy his accousticon.

It was natural that Edison, inventor of the phonograph and then doing research work in sound recording and sound reproduction, would become interested in this young man who was attaining success in another branch of accoustics. In 1910 Hutchison became associated with Edison in a professional capacity. Two years later Hutchison became Chief Engineer of the Edison Laboratories. His childhood ambition was achieved. Shortly thereafter he was promoted to the position of Chief Engineer of all the Edison interests, as well as personal engineering advisor to Edison.

No two men ever worked together in more perfect harmony. Edison found that his new associate thrived on work. He had at last found a man who could, and would, match his own 18 hours a day—and like it. Hutchison knew there was no royal road to inventing. He appreciated the truth of Edison's remark that "Inventing is the hardest kind of work." That both men believed in the truth of Edison's statement—"Genius is two per cent inspiration and 98 per cent perspiration"—is verified by the records of this pair. Hutchison spent days at a time in the laboratory without going to his beautiful home in Llewellyn Park, only a quarter mile away.

Only once did an invention seem to spring from Dr. Hutchison's brain without demanding any of that "hardest kind of work." It happened back in 1918 that Dr. Hutchison needed a gasoline gauge. In those days none was to be had. Quickly the Doctor made up one. It proved so satisfactory that he instructed his assistant to have it patented. The Patent Office refused his application on the ground that Hutchison had patented the identical thing ten years before. Dr. Hutchison had forgotten all about his patent! "I thought that invention developed itself mighty easily," he remarked.

The Edison-Hutchison association, moreover, was extremely fruitful. During this period Hutchison patented approximately one hundred in-

The TRUE EXPERIENCE of PAUL SHEA
OF SPRINGFIELD, N.J.
I HATE TAKING
SURE WISH I COULD BACK OUT OF REHEARSAL TONIGHT—THESE PIMPLES LOOK FIERCE!
READ PAUL'S OWN STORY
I WONDER IF FLEISCHMANN'S YEAST WOULDN'T HELP YOU? I'M GOING TO GET YOU SOME— IT'S WHAT A SKIN DOCTOR TOLD LAURA TO EAT— AND SHE SAID IT WAS WONDERFUL
IT SURE IS WONDERFUL IF IT REALLY WORKS
LATER
ALL READY, SON? DAD SAYS HE'LL DRIVE US OVER TO THAT RADIO AUDITION
O.K.— SAY MUM— THOSE YEAST CAKES ARE THE STUFF, ALL RIGHT— LOOK— THERE'S NOT A HICKIE LEFT—

ventions, among which may be noted: an air conditioning system not materially different from those now being installed; storage batteries, automobile horns, an automobile self-starter, internal combustion motors, improvements in his earlier ear phones and in telephony, loud speakers of many kinds, and even an arrangement for a self-service store!

When the United States entered the World War, President Wilson appointed Dr. Hutchison, as a dollar-a-year-man, to the Naval Consulting Board. During the Spanish-American War of 1898, Dr. Hutchison was engaged in laying submarine mines and cables in harbors on the Gulf of Mexico. As far back as 1904 he was awarded a medal for the installation and operation of the first commercial wireless telephone. Even before that, in 1902, the King of England had decorated him for merit in the field of invention. He has been honored with membership in over twenty of the leading scientific and technical organizations of the world.

Such honors, however, have not been the supreme thrill of Dr. Hutchison's life. The Doctor says that he gets more thrilling satisfaction when he beholds some individual, afflicted with defective hearing, conversing with a friend or attending theater or church, hearing normally through aid of his inventions.

Although Dr. Hutchison has produced and marketed hundreds of inventions, of a total value exceeding $400,000,000, he has never been sued for infringement of any patent. Of this he is very proud. And it is indeed pardonable, for this unique distinction has its foundation in a sort of humanitarianism the man puts into his work. When it appears that someone else actually made an invention first, Dr. Hutchison never puts up an argument. He just abandons the field to his rival. In numerous instances where he has stepped aside for fear he might wrong someone, he actually has assisted his rival in perfecting the invention and has even suggested where it might be sold.

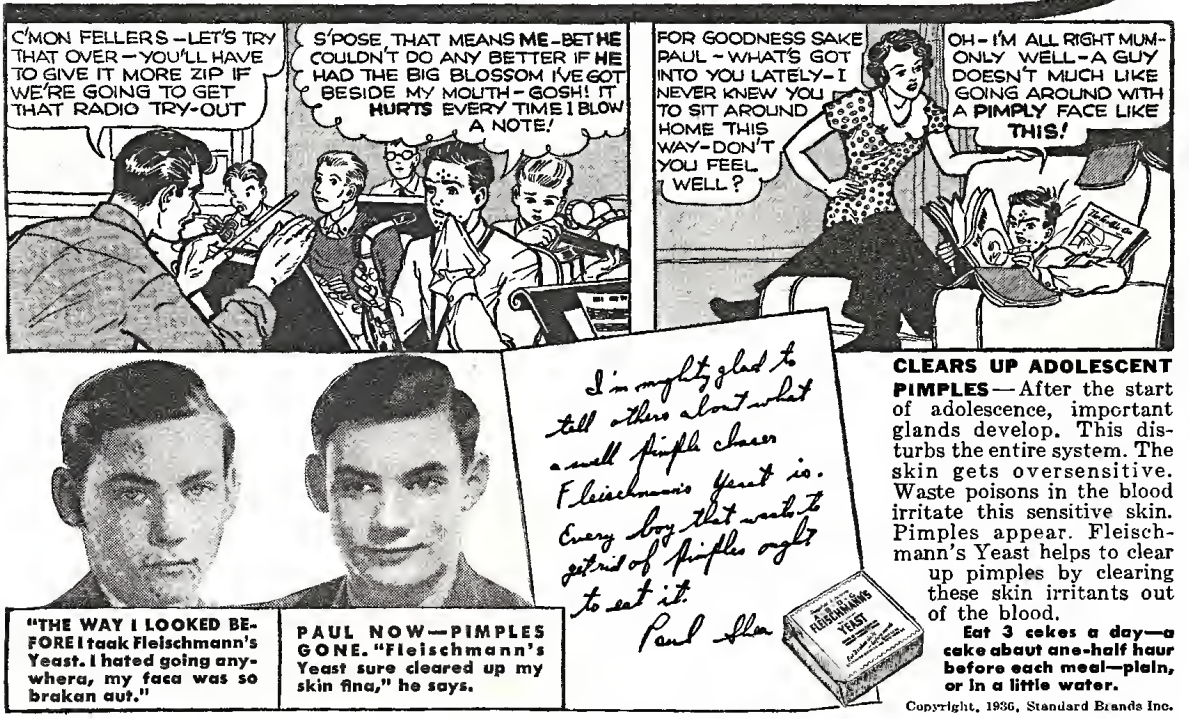
Now slightly over 60, Dr. Hutchison still works 19 hours a day, and is the picture of health. In fact he has never spent a day in bed since infancy. He attributes his health and strength to regularity in habits, including daily exercises and horseback riding, and to never allowing himself to worry.

"Hard, diversified work harms no one," he says, "if not accompanied by dissipation. I have taken but three vacations in my life. The last one—20 years ago—cost me $5,000 because I bought a speed boat and spent the entire time working on it to make it go faster."

One of Dr. Hutchison's assistants once came to him with a new discovery which he and two friends had made. "As I am in your employ, my share automatically belongs to you," the assistant explained, "but my two friends have contributed independently to the invention." The Doctor immediately replied, "I will assist you three men,

[*Continued on page* 120]

THIS FACE ANYWHERE!


C'MON FELLERS—LET'S TRY THAT OVER—YOU'LL HAVE TO GIVE IT MORE ZIP IF WE'RE GOING TO GET THAT RADIO TRY-OUT
S'POSE THAT MEANS ME—BET HE COULDN'T DO ANY BETTER IF HE HAD THE BIG BLOSSOM I'VE GOT BESIDE MY MOUTH—GOSH! IT HURTS EVERY TIME I BLOW A NOTE!
FOR GOODNESS SAKE PAUL—WHAT'S GOT INTO YOU LATELY—I NEVER KNEW YOU TO SIT AROUND HOME THIS WAY—DON'T YOU FEEL WELL?
OH—I'M ALL RIGHT MUM—ONLY WELL—A GUY DOESN'T MUCH LIKE GOING AROUND WITH A PIMPLY FACE LIKE THIS!
I'm mighty glad to tell others about what a swell pimple chaser Fleischmann's Yeast is. Every boy that wants to get rid of pimples ought to eat it.
Paul Allen
FLEISCHMANN'S YEAST

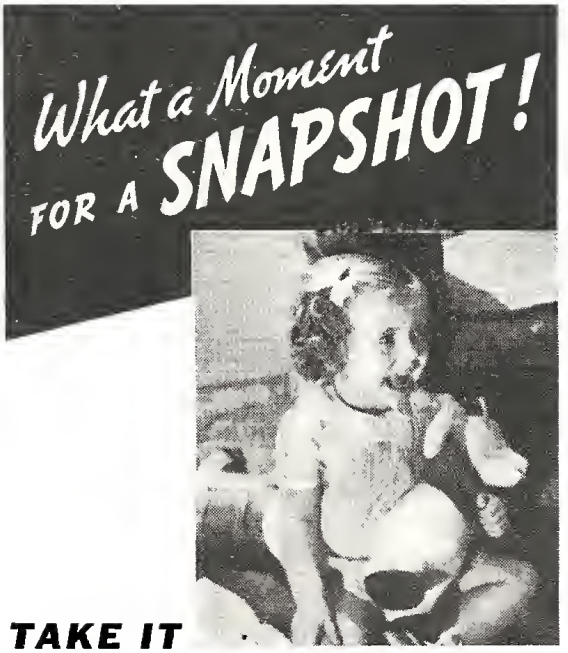
"THE WAY I LOOKED BEFORE I took Fleischmann's Yeast. I hated going anywhere, my face was so broken out."

PAUL NOW—PIMPLES GONE. "Fleischmann's Yeast sure cleared up my skin fine," he says.

CLEARS UP ADOLESCENT PIMPLES—After the start of adolescence, important glands develop. This disturbs the entire system. The skin gets oversensitive. Waste poisons in the blood irritate this sensitive skin. Pimples appear. Fleischmann's Yeast helps to clear up pimples by clearing these skin irritants out of the blood.

Eat 3 cakes a day—a cake about one-half hour before each meal—plain, or in a little water.

Copyright, 1936, Standard Brands Inc.



TAKE IT

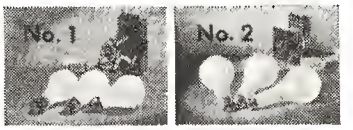
easily with G-E MAZDA Photo lamps

What a moment for a snapshot! Chances are that *you* have said this about some indoor scene. Now you can snap precious indoor pictures with *your* camera . . . thanks to G-E MAZDA Photo lamps.

It's easy. *If your camera has a fast lens* — F/6.3 or faster — use supersensitive film and several G-E MAZDA Photoflood lamps No. 1. Good for dozens of pictures. 25 cents list. *If your camera has a slow lens,* open it wide, use supersensitive film and G-E MAZDA Photoflood lamps No. 2. Twice the light of the No. 1 and three times the life. 50 cents list.

Here's what you need

Put two G-E MAZDA Photoflood lamps in A and one in B. Place the lamps at the distances indicated. Tip shades to concentrate the light or use inexpensive paper reflectors. Then, when ready, click the shutter.

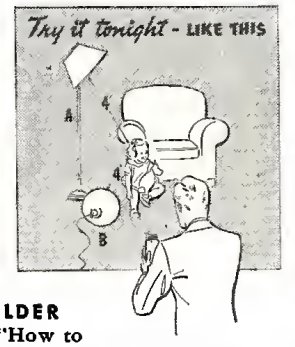


FOR FAST CAMERAS FOR SLOW CAMERAS

FOR ACTION SHOTS, or with a box camera, set camera for "time" and use a G-E MAZDA Photo*flash* lamp. Each lamp gets one picture. 15 cents list. Your druggist or camera dealer can supply you.

LOOK FOR THE MARK

to get dependable light for picture-taking



FOR PICTURES AT NIGHT

FREE FOLDER

Send for "How to Snap Pictures at Night." Write General Electric Co., Nela Park, Cleveland, Ohio.

GENERAL ELECTRIC MAZDA PHOTO LAMPS

Dr. Miller R. Hutchison

[*Continued from page* 119]

but I will not accept one iota of your share of the invention."

Dr. Hutchison recently told how this conversation came about. His assistant had stumbled onto the secret of a chemical emulsion that does away with the tedious, time consuming method of printing photographs from negatives. Three years ago Francis A. Holt, of Hutchison's Fifth Avenue laboratory staff, and Karl Robinson and George Crouse, were treating films in an experimental solution. But something had gone wrong; the film, instead of coming out negative, developed into a positive print. After checking back painstakingly for months, they traced the blunder that is revolutionizing photography. Hutchison formed a company for them—and immediately sold $150,000 of stock.

At present Hutchison is working on a finely dispersed photo emulsion which makes huge picture enlargements possible. He has managed to "blow up" 1" x ¾" snapshots to more than 3,000 times their original size.

A Cigar Box Photo Enlarger

[*Continued from page* 114]

Loosely wedge two stop strips in the other side. After bringing the negative to a sharp focus on a sheet of thin paper at the other end of the chamber, by moving the frame forward or backward, the stop strips can be glued down and serve as a permanent stop when adjusting the frame to the camera at other times.

Stop strips are also placed in the other end of the chamber to hold a sheet of glass in place. The enlarging paper is merely placed against the glass and the lid of the last cigar box closed. If the lid does not make a light-tight fit, glue strips of black velvet around the edges.

Fig. 5 shows the completed enlarger with camera in place and ready for use. The paper is of course inserted in the dark room. Set the camera shutter for "time" by pulling out the lever made for this purpose. One click of the shutter will open it for the exposure, another will close it. Pointing the negative at the sky through a window will furnish a well diffused light; if electric light is used, place the lamp several feet from the negative or use a sheet of tissue paper for diffusion.

Fingers From Dinosaurs

Plants had their troubles in the days of the dinosaurs no less than today, a fossil fungus disease described by Drs. M. A. Chrysler and C. M. Haenseler shows. Leaves of a cycad found in a lignite formation of an ancient New Jersey bog were found infested with the feeding threads of the parasitic plant, which would be clearly seen and photographed in microscopic sections.

Accept No Substitutes! Always Insist on the Advertised Brand!

FORD OWNERS ALONE ENJOY THIS

MONEY-SAVING FEATURE

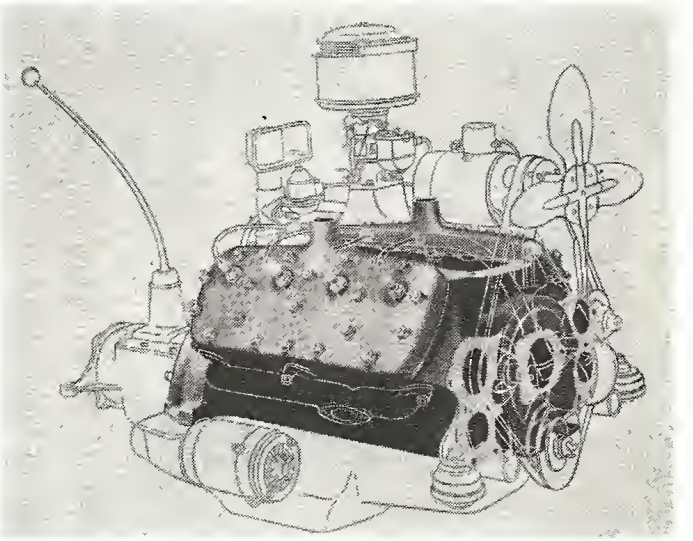
Engine and Parts Exchange Plan

You may never need to have your Ford V-8 engine overhauled. But if you should, after thousands of miles, you'll appreciate the time and money-saving advantages of the Ford Engine and Parts Exchange Plan.

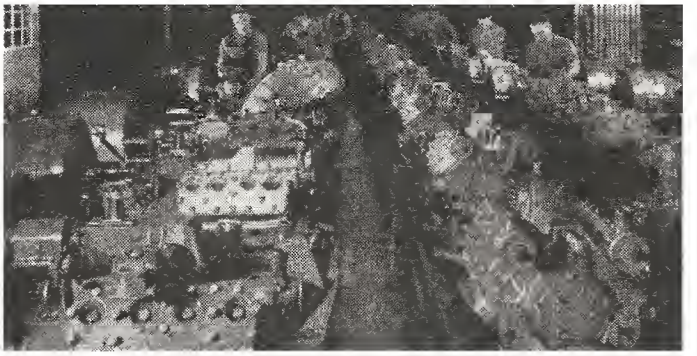
Through this plan you can exchange your Ford engine for a factory-reconditioned engine at a big saving over the cost of an engine overhaul. A complete engine overhaul usually costs well over $85. A Ford factory-reconditioned engine may be installed for $56 (slightly more west of the Rocky Mountains). This includes reboring of the cylinders, new pistons, piston pins, piston rings, bearings and valve springs. Crankshaft, camshaft, valve lifters, valves, retainers, timing gears and oil pump are either rebuilt or replaced with new ones as needed.

Many other reconditioned Ford parts, too, are available at remarkable savings to Ford owners—savings made possible by Ford mass production methods. In the case of all Ford reconditioned engines and parts, experienced workmanship, quality materials, precision manufacturing methods, rigid tests and inspections are the same as in the building of new Ford engines and parts.

Ask any Ford dealer or any garageman who displays the sign, "Genuine Ford Parts," to give you complete details of the Ford Engine and Parts Exhange Plan.



Phantom view of Ford V-8 engine, showing parts included in Engine Exchange Plan in solid black.



(Above) Reconditioned engines are block-tested and given the same rigid inspections as new engines.

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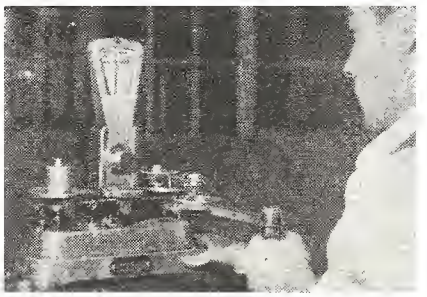
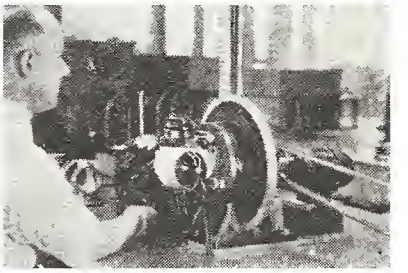


All reconditioned parts are subjected to final tests on performance and adjustments. Photo at right shows a reconditioned distributor receiving final test.

Parts used in reconditioning the engine are tested and inspected with the same care as parts used in new engines. Photo at left shows inspector checking weight of connecting-rods on sensitive balance.



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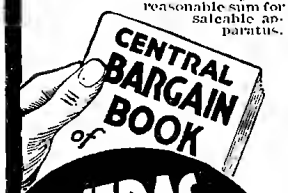

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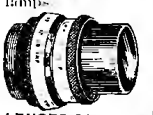

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Novel "Scottie Dog" Radio

[*Continued from page* 111]

through a hole in front of the cabinet, just under the dog's head.

In making connections beneath the chassis, let resistors and condensers be supported by their own leads. Twist filament leads together to keep down hum radiation. Make all wires between the chassis and the top of the cabinet long enough so you do not have to unsolder connections to remove the top, should it be necessary to make any changes.

Note especially the polarity of the electrolytic condenser leads. The black lead is always negative, and must be connected to the negative lead or ground in the circuit.

Check all connections carefully against either the circuit or pictorial diagram before trying out the receiver. All tubes should heat up within a few minutes after the switch is turned on, and you should be able to see the end of the red-hot heater in the glass 6P7 tube, if all connections are okay.

Setting the condensers is the next problem. Use a very short screwdriver with an insulated handle, or better yet, a screwdriver cut from a piece of hardwood or an old comb, since body capacity will affect the settings. Set the switch to one pair of contacts and adjust the condenser on the oscillator side (the group whose common lead goes to the oscillator coil) until you pick up a station. Adjust the other condenser of that pair for maximum volume, then change the switch setting and repeat for another station. Do this for all switch settings, adjusting the volume as necessary in each case, then set the switch to the weakest station and adjust the I. F. transformer trimmers (through holes in the top of the shield) for maximum volume.

For the cabinet you need a small compass saw, a coping saw, a plane and a few sheets of sandpaper. Cut out the body first, from quarter inch plywood. The cuts are all quite easy; to cut the loudspeaker hole, simply drill a quarter-inch hole, insert the coping saw blade, assemble the saw and cut out the circle. Plane all rough edges to save effort when sanding.

Assemble the cabinet with brads first, then make everything secure with four-penny finishing nails. By using a little care when driving these, there will be no danger of splitting the plywood. Note that the side pieces cover the ends of all other pieces, making the finished cabinet exactly 7¼ inches wide. The notches in the top and the upper back pieces will depend somewhat upon the position of your switch contacts and the construction of the tail. Leave these cuts until last.

"Scottie's" head is built up from seven pieces of ¾-inch pine, the pieces being cut to the outline of the head through one ear, assembled with nails and glue after cutting out space for the pilot light bulbs on five of the pieces and the slanting cuts then made for the ears and the sides of the nose. Although the eyebrows can be cut as a part of the head, a neater job is obtained if a triangular strip is cut separately and nailed crosswise over the brow. All cuts can be trued with the blade of your plane, then sanded down carefully.

Holes for the marble eyes can be gouged out with a penknife, cutting deep enough so the marbles will go in a bit beyond their diameter. Fill in the irregularities around the eyes and in any other spots with plastic wood. By all means, if you want a real cabinet, counter-punch all nails and fill in the holes neatly with plastic wood.

The tail is cut from ¾-inch pine and a $\frac{3}{16}$-inch hole is drilled through the lower end, for the metal rod on which it pivots.

The mounting of the pilot light sockets in the head will depend upon the type of socket at hand, but generally a single screw will be sufficient for each socket. Solder leads to the sockets before mounting them.

The speaker is attached to the underside of the cabinet top with flat head bolts which are countersunk and covered with plastic wood.

Two bolts, one going through the lower back piece and the back side of the chassis, and the other going from the front side of the chassis through the bottom of the cabinet, hold the two parts of the receiver rigidly together and insure a tight fit between the sides and the top of the body. With all parts of the cabinet completed, assembled, and sanded, "Scottie" is ready for painting. Apply an enamel undercoat. Sand this lightly, when dry, then apply one or two coats of dull black enamel of good quality.

The speaker grille can be any piece of black cloth placed between the speaker and the top of the cabinet. This can be glued to the underside of the cabinet or glued to a cardboard washer whose inner diameter is equal to that of the hole in the cabinet.

This completes the construction of "Scottie." You will be agreeably surprised at the way he reproduces low notes; the construction of the cabinet is such that you secure a baffle effect equal to that of many high priced floor models.

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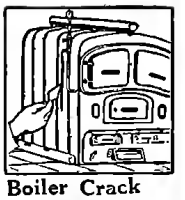
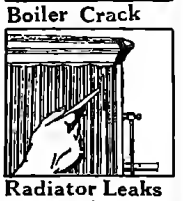
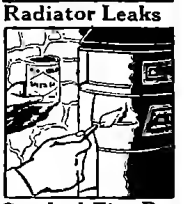
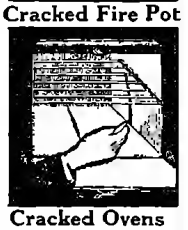

Boiler Crack


Radiator Leaks


Cracked Fire Pot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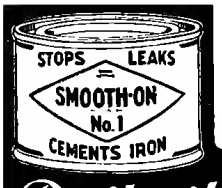

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Binding Magazines

[*Continued from page* 98]

with paste, double them over pieces of heavy twine or cord, and apply to the book during the gluing process as shown in Fig. 6. Clip off the cord that extends from each side.

Cut two pieces of heavy cardboard (riceboard or bookbinders board obtainable at most print shops is best) 6⅝x9⅞ inches; this is the same width as the trimmed book, and ¼ inch longer. Also cut a piece of lightweight cardboard, about the weight of a government post card, 9⅞ inches long and as wide as the thickness of the sewed book, measured across the back.

The best cloth to use is buckram or bookbinders cloth, but if it is not available, a fair substitute can be made of denim, automobile topping or linen. Cut a piece of this material large enough to allow about ¾ of an inch to extend beyond the covers on all sides when laid out as in Fig. 7.

Cover one side of the cardboards with paste and press down in position on the cover cloth, after first determining the space required between them (see Fig. 7). Then paste the thinner card and center it in position between them. Clip the corners of the projecting cloth as illustrated, fold the edges over and paste them down. They need not be pasted to the narrow strip in the center.

The cover may be made at the same time the book is glued, and allowed to dry. It need not be clamped, for warping will do it no harm.

After the book has dried a day or two, remove from the clamps and paste down to the outside of the end papers those strips and the cloth hinges which were left projecting at each side. Cover one entire side of one end paper with paste and place the book in position on the cover as shown in Fig. 8. Care must be taken in this operation to get the paste only on the end paper and not to allow it to curl and get paste on another page. Now paste the other end paper, press cover down over it and clamp the book tightly between boards until it is thoroughly dry.

Girl Hams

[*Continued from page* 65]

station, discovered he could get more answers to his calls with a girl's voice in the station. When she got on the air with her own station, she discovered she liked c. w., or code work, better. She can send and receive 30 to 35 words a minute. In the past three years she has had 2,000 contacts with nearly 900 stations.

Another, like W8KYR, who acquired the ham radio virus through family contact, is Mrs. M. D. Jones, W9ILH. In 1931 her husband, needing code practice while "boning up" for his "ticket," asked her to help him. She became so intrigued that she took the examination with him, and passed. Since then she has become one of the best known of the telegraphing XYL's. With a half kilowatt transmitter, automatic in operation with band-switching from the panel, W9ILH is a bright spark on the 40 and 80 bands.

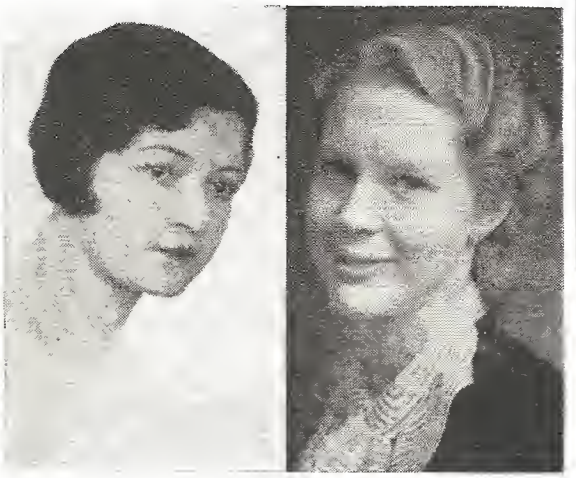
Microphone fright started Nellie Hart, W7NH, off as a feminine ham. Miss Hart has an interesting background to her amateur career, also. Raised on a cattle ranch in southeastern Oregon, sixty miles from a railroad, Miss Hart moved to Idaho at the age of 14. After attending the College of Idaho, she was variously employed as a bookbinder and sound movie projectionist. Now she concentrates on amateur radio, in which she developed an interest as a result of "mike fright" while talking over a friend's phone rig.

Opal Sisk, W9CMV, of Kansas, was studious and serious and didn't care much about going places until she was introduced to amateur radio.

Now an ardent enthusiast, she is constantly on the air, going places via short wave. "A new life has opened up before me," she says. "One thrill after another, new contacts every day—new friends, letters, cards and calls."

Members of the world's prize radio family are three sisters in far New Zealand. They are Kathleen Kirby, ZL4DT; Nancy Kirby, ZL4FN, and Mrs. Peggy Cameron, ZL4CL. It was Mrs. Cameron's husband, Ewen Cameron, ZL4BJ, one of New Zealand's best known amateurs, who first inspired interest in the rest of the family, which includes a younger brother, an active amateur.

Taking advantage of freak conditions due to changes in sun spots, Nellie Corry, of Walton-on-the-Hill, Surrey, England, tapped every continent on a home-made set with only a 10-meter wave length, making radio history.



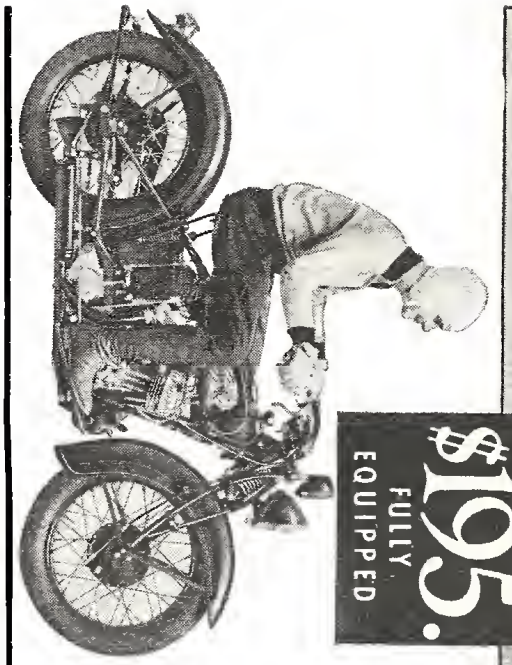
Few who are interested in radio below 200 meters do not know of Judy Leon, of Rio Bamba, Ecuador. Right—Nellie Hart, of Idaho, who was frightened by a microphone only to become an ardent YL ham. She is now a topnotch code operator.

There are few radio fans interested in listening below 200 meters who do not know Judy Leon, HC1FG, of Rio Bamba, Ecuador, who is also the announcer at the broadcasting station "Prado"—6,618 kilocycles—key to the Indo-Latin chain of which she is "Capitana." During the 1935 amateur DX tests, Senorita Leon piled up more points than any other station outside the United States and Canada. She is proficient in both phone and code work. Besides radio she likes automobiling, horseback riding and dancing.

Isle Royale, in Lake Superior, is a lonely and almost isolated spot in winter, while it overflows with tourists in the summer. Perhaps the island's most interesting permanent inhabitants are the Johnsons of Chippewa Harbor. Two members of the family, Violet and Vivian, operate radio station W9PCU, which they started during the long winter months.

Alice Fitzgerald, operator of station W1FRO in Watertown, Mass., is an outstanding participant in competitive amateur radio activities, yet finds time for skiing, bowling, skating, swimming, rifle shooting and music.

NEVER BEFORE AT



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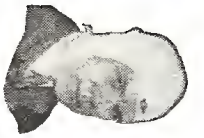

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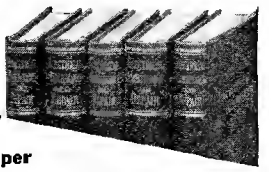

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"Midget Mike" Locomotive

[*Continued from page 95*]

rod. Drill a No. 56 hole and tap 0-80 at the point indicated for the screw to hold the main rod; then insert an 0-80 brass screw.

To construct the cylinder block from brass and wood, you must make the front and back plates of brass in the same manner as described before. Then take a block of semi-hard wood such as poplar, ½" thick, 1¼" long and 1¼" wide. Stand the two brass end plates in a vertical position with the wood block in between. As with the other method, the necessary holes must be drilled in the rear plate before assembling. In this case, however, the slots for the lower cross-head guides must also be filed in the front and back plates. When the work is set up and properly aligned, clamp the pieces in place and cut the two slots in the wood for the lower cross-head guides and solder them in place. Then saw or rasp the wood block to the curve at the top of the block and solder the curved boiler support in place. Then saw or rasp the rest of the cylinder block to the outline of the brass plates and sand smooth. A small strip, cut from sheet brass is then sweat in place on the front plate. The cylinder block is now set in place on the frame and soldered on. The holes for the cross-head guides must be located in the exact spot as shown on the plans or the main rods will not clear the crank pins in the front drivers. The two valve rods are now bent from heavy brass wire, one end soldered into the cylinder block and the other end into the previously drilled hole in the main frame.

The side rod, which connects the two drivers, is cut from a strip of 1/32" brass. To mark the location of the crank pins, lightly scribe a line across the center of the crank and hub. Measure 5½ millimeters from the center of the axle and lightly prick punch the location. Then measure for the other three crank pins by laying off the distance with a pair of dividers. Drill a No. 56 hole NEARLY all the way through the wheel and tap 0-80. Now, lay off, with the dividers, the distance from the center of the front axle to the center of the rear axle. This is the distance between the centers of the crank pins. Turn the wheel slightly on the axle if the distance is not exactly the same, as any binding at this point would not allow the engine to run smoothly. This same distance is also used to lay out the centers of the holes in the side rods. Drill these holes No. 52.

The main rod is also of 1/32" brass. Drill a No. 52 hole in both ends. Then fasten one end to the cross-head with an 0-80 brass screw. Do not set the screw tight but leave a small play in the main rod. Then solder the screw in place from the outside of the cross-head and file off even with the hub. Now fasten one end of the side rod to the front driver with an iron 0-80 screw. The screw will be too long so you must file off part of the threaded end until it pulls up tight and leaves a small amount of play for the rod. File the head thinner until there is just enough left to grip in case you want to remove it for any reason. Then fasten the other end of the side rod, together with the end of the main rod, to the rear wheel.

Molds Future Out Of Clay

[*Continued from page 87*]

"The model was built to actual scale, one-half inch to the foot," Mr. Loewy explained. The model rested on a shelf behind his desk as we talked. "We took an actual mechanical drawing of the locomotive's running gear, photographed it to scale, and mounted the print on wood which was sawed out into the shape of wheels. With this as a foundation, we built up the clay model."

In the wind tunnel at New York University, the model was suspended over a moving belt and the velocity of air regulated to simulate the actual running conditions faced by a cross-country locomotive.

"By holding a stick in front of the model, with thread-like silk streamers attached, the path of the air currents along the models was made visible," said Mr. Loewy. "In this way we could see where the design was at fault, and cut away or add a bit of clay here and there to correct it. For this reason clay has superseded wood for

models. With clay, alterations can be made immediately right on the spot."

The finished clay model is a perfect miniature of the full-size locomotive. The front of the boiler is rounded off with a bullet-like nose, and the "cow catcher," headlight, and projecting parts which create air resistance are skillfully blended into graceful contours sweeping back to the cab.

The advantage of streamlining the K4s, aside from many practical advantages incorporated in the application of this styling to the locomotive, lies in the fact that, when running at high speeds, a reduction in the wind resistance is effected.

Color and function and optical appeal must all be considered by the engineering designer. Recently Mr. Loewy was called upon to solve an unusual problem. The Greyhound Bus Company operates transcontinental busses in all the states of the Union. Each state has its own regulations as to license display and arrangement. The problem: to create a paint scheme in the blue and white colors of the company to comply with all state regulations and produce a flowing streamlined effect.

Often the work of the designer actually becomes that of the inventor. A refrigerator which Mr. Loewy designed is an example. Instead of the usual handle on the door, the lock is placed on the frame outside the door. It is a slender chromium rod about a foot long whose purpose at first glance seems purely ornamental. It is at breast level. The housewife with her arms full of dishes need only touch the rod with her elbow and the door springs open. Thus a device which began as a design becomes a patented invention.

The first step in creating a new design is to consider it in terms of efficiency and beauty.

"Efficiency not only as regards its operation," Mr. Loewy pointed out, "but also in relation to manufacturing methods. A beautiful new design need not cost more to make than an old-fashioned one—often it costs less. In our 1936 refrigerator, for instance, the dies from which one side of the box is pressed are simply reversed to produce the opposite side."

The same process of development is seen in Mr. Loewy's evolutionary charts of the automobile, the railway car, the house.

"Curved glass is the next step in body design," Mr. Loewy said. "It is perfectly feasible. The motor is at the rear where it logically belongs—where it needs no long driveshaft and where its noise, heat and exhaust gasses cannot annoy the passengers. Baggage space is placed in front of the driver to balance weight distribution on the front wheels and to give collision protection."

Raymond Loewy was born in France, though he is now becoming a naturalized American. By profession he is an electrical engineer, a graduate of the University of Paris, a member of the S. A. E. He served for four years under the colors of France in the World War, and after the armistice came to this country to study under the noted Dr. Charles P. Steinmetz of the General Electric Laboratories at Schenectady.

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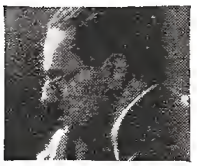

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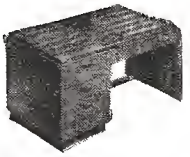

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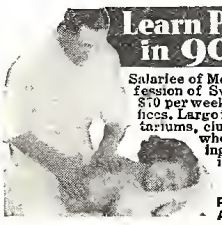

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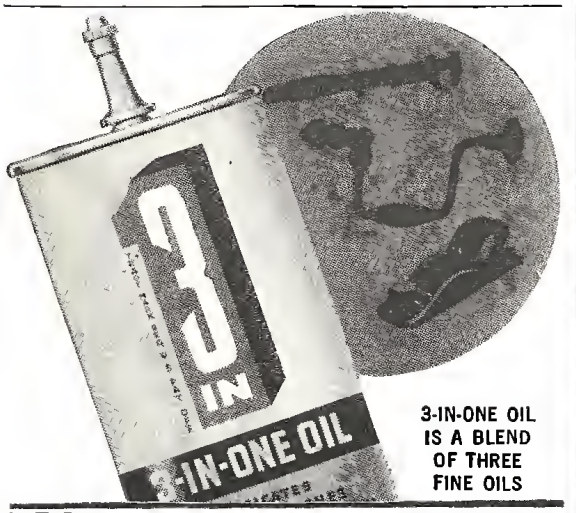

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The Camera Queen

[*Continued from page* 71]

banker wanted her to do some interiors of his place of business, still later she was asked to do work for a few large corporations—the Aluminum Company of America, the Standard Oil of Ohio, the Chrysler Corporation.

In 1929, she was asked to join the staff of Fortune Magazine—a step up which afforded her a chance to take some of the pictures which have since made that magazine famous. Among these were the ones she made of the drought in 1934.

"I chartered a plane and went to Omaha," she recalled, "and then made my way to Texas and the Dakotas. The heat was intense and I used to get up at 4 a. m. and work for six or seven hours at a time. I had to work quickly, too, for the pictures had to be published before the drought was over."

I asked her what types of cameras she prefers.

"Well," she said, "I used to like a big camera but lately I've had excellent results with a candid camera. Improvement in fine-grain developers has made it possible to get very good results with a small camera. And they are easier to handle. And, of course, I have a large and varied assortment of lenses."

During this period, Miss Bourke-White made three trips to Russia to record photographically the five-year plan. She made the first motion pictures ever filmed there by a non-Russian with the full permission of the Soviet authorities.

She declared the Russians made excellent photographic subjects because of their inherent sense of drama.

"Unlike the average American," she said, "the Russian dramatizes himself to the point where he is almost perfect in a pictorial sense. You don't have to ask him to pose for you—he seems to sense what you are looking for in a picture."

While we were discussing posing, she told me that some times she has to wait for hours to get the right effect in a photograph while on other occasions she has snapped the subject instantly.

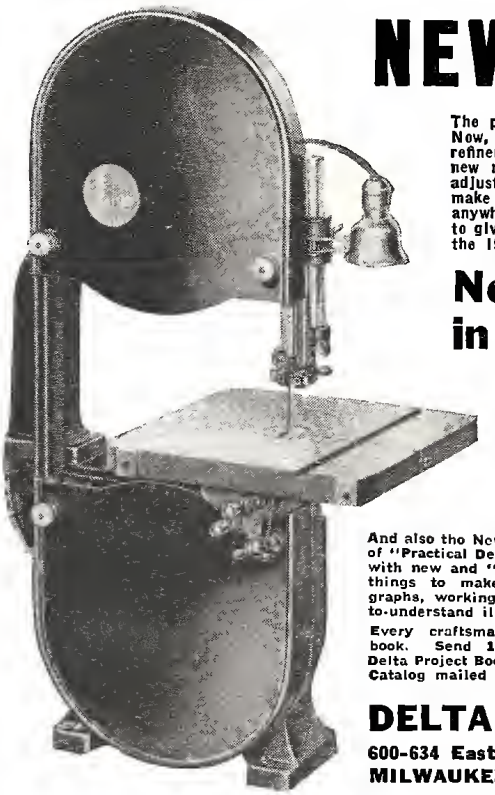
"I know that some believe I get my results because I can take so much time," she confessed. "Well, of course, that's true to a certain extent. It does help to be able to get the scene to your liking. But often the best results are obtained when you work fast and catch the subject on the split second. Woman make especially good portrait photographers because men won't rush out on a woman.

Perhaps the underlying theme of Miss Bourke-White's work is its sincerity. This is largely the result of the study she makes of each new job, the groundwork she lays before she is ready to focus her cameras. Last summer she spent several months in Brazil making photographs of coffee plantations for the American Can Company.

"I practically lived with the workers," she said, "and observed every step in the making of coffee."

Miss Bourke-White, who dons men's trousers

[*Continued on page* 147]



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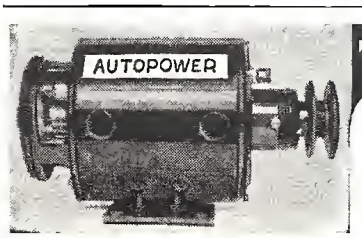

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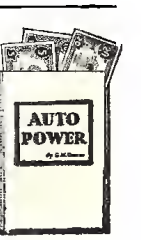

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Skiing For Beginners

[*Continued from page* 77]

is a comparatively modern sport. The Armenians of Eastern Europe and the Mongols of Western Asia used skis at the dawn of history. The Lapps were known to the early Scandinavians as "Skrid Finnen," or sliding men, long before the beginning of the Christian era. But these people used skis merely as an aid in herding or hunting. It was not until late in the last century that the Scandinavians turned skiing into an international pastime.

While skiing is fast becoming the outstanding winter sport of the United States, it is relatively new even in Switzerland, mecca of world skiers. Skis were introduced to the Swiss in 1883 when a traveler presented the monks of St. Bernard with a pair of the Scandinavian sticks. Six years later the friars had learned to use them so well they were able to stage races among themselves, but it was as late as 1899 that a Norwegian skier tested out the Swiss Alps, found them ideal, and introduced skiing as a sport there.

Prior to 1920 the chief winter sports in the United States were tobogganing and snowshoe trekking, both adopted from the Indians. However, the Scandinavians had introduced skiing in the Midwest several years before they had inaugurated the sport in Switzerland. As early as 1893 America had begun to make ski history by developing the most sensational type of skiing—ski-jumping. Torjus Hemmestvelt, one of the first of the world's jumpers, that year made a leap of 103 feet at Red Wing, Minnesota. The world's record jump of 311 feet is claimed by Reidar Andehsen, made at Planica, Yugoslavia in 1935.

But skiing was a sport of a very few and the public knew of it mainly through the newsreels. Schools and colleges have been leading the way toward making skiing an all-American sport. Five years ago the average American "ski fan" was satisfied merely to look on, as he is at ball games. Now, not content with just watching the dare-devils take to the air off a trestle or skim in graceful curves in a Slalom race down a hillside, Americans by the thousands are taking to skis themselves, discovering at first hand the most exhilarating sport in the world.

And instead of being restricted to young people, men and women sixty and over are enjoying this means of health and wintry pleasure. Youngsters take to skis like ducks to water.

To the novice the selection of skis is important. Many a beginner who has tried to learn this glorious sport on a pair of poor skis has given up in disgust, never to know what fun he is missing. The wood that goes into a pair of skis is of no little moment. Experts who have tried skis under the most trying conditions, insist that hickory is best. Ash and maple are second choice. Pine is a doubtful third.

A point worth careful consideration is how the wood used in your skis has been seasoned. Ski

[*Continued on page* 136]

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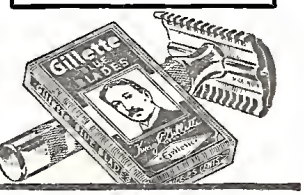

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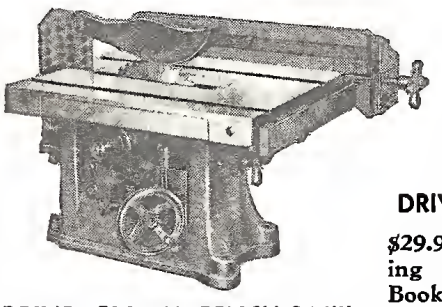

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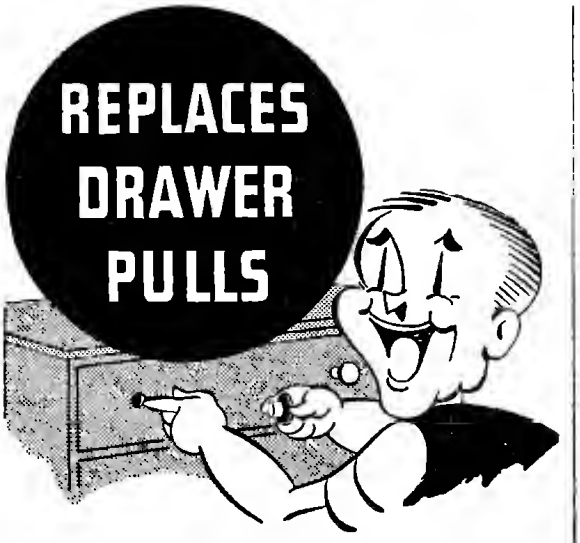

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D'Artagnan Comes Back

[*Continued from page* 84]

Navy Clubs, the University Fencing Club of New York, and scores of unaffiliated groups scattered over the nation.

Among the many virtues of the sport of fence is the fact that it is not expensive. A complete outfit may be had for as little as $15, with minimum costs approximately as follows: padded canvas jacket, $5 (a home-made plastron, or pad for the chest and shoulders, may be substituted); foils, $2; gauntlets, $2; mask, $2.50; and shoes $3.50. Tennis shoes may be worn if desired, and regulation uniforms are required only for actual competitions. Lessons may be had for as little as $1.50 each, although many schools and colleges offer free instruction. Almost any place where the light is good may be used as practice ground.

The deadly art of duelling, which in less than 200 years cost the lives of 50,000 romantic Frenchmen, today is practiced only for fun, but occasionally it becomes serious and makes the headlines. Dr. Franz Sargas, Hungary's "me against nine" duelist, crossed sabers with three men in Budapest not long ago over alleged insults to his wife. Sargas had wounded the third with a sword when police interfered.

Premier Mussolini, who all his life has been a very keen fencer, recently gave a public exhibition of his skill when he paid a visit with a delegation of German newspapermen to the Fascist Academy of Physical Culture in Rome. Mussolini watched a number of cadets at their daily fencing practice, suddenly jumped to his feet, threw off his tunic and called for a sword and mask. After a ten-minute bout in which he defeated a very much surprised cadet, Il Duce fenced a further quarter of an hour with the fencing master. It was a draw.

Col. Henry Breckinridge, a crack fencer and captain of the U. S. Olympic team in 1928, occasionally hits the headlines with his rapier-like wit in the political field.

"Blood and Iron" is still the philosophy of the German students. When fencing is prohibited by law as it frequently is, it is "bootlegged." Nearly every Sunday morning, and often during the week, a well-known Fechtschule (fighting school) is the scene of the gentle art of student duelling. Bouts begin at 8 in the morning and last, with intervals of beer drinking, until noon.

These are real duels, and the students are proud of the scars that they bear on their faces for the rest of their lives. The swords they use are long, blunt-tipped weapons with fairly sharp edges. The style of fencing is radically different from that known to American students. There is no lunging, no touching with the point, but a striking, flashing stroke at the uncovered head and face.

Down through the centuries, fencing has developed from a hacking, brute-strength combat into a science of quick, deft movements and rapid-fire thrusts and parries. The ancient battle-axe

and pikestaff became a sharpened blade, with a handle and protecting rings for guarding the fingers. As late as the Fifteenth Century, the sword still was a heavy, clumsy weapon used chiefly for hewing armor.

But as the art of sword play was developed by European masters, the weapon grew lighter and better balanced. Combat became faster, more skillful. Medieval swordsmen sought an elusive "botta secreta," or trick thrust that would penetrate any defense. Wealthy nobles paid fortunes to masters who would teach them secrets such as a "universal parry," supposed to be proof against any attack.

"Hold your foil as if you had a little bird in your hand—firmly enough to prevent its escaping, yet not so firmly as to crush it."

This advice from a celebrated French master summarizes the delicacy and balance of modern swordsmanship. Swordsmen of today no longer try to plunge their weapon through their adversary's heart, but the principle of touching a vital part with the blade still holds good.

Touches with the foil count anywhere on the body from the top of the collar to the groins, excluding head, arms, and legs, but if the arm or the head is used to shield the body, they too become vulnerable.

As sword combat has developed from a life-and-death struggle to a vigorous, courageous sport, weapons have changed to speed up play.

The small-sword, double-edged and thick in the middle, has developed into the square-bodied fencing foil and the triangular épée. The military sabre, thick on one side with a cutting edge on the other, has become the lighter fencing sabre.

The standard foil measures 35 inches from the guard, or bell, to the tip, has a slightly curved handle, and weighs not more than 24¾ ounces. The point of balance should be just outside the guard. The épée is similar but heavier and stiffer, with a thicker handle and larger guard. Its blade is diamond-shaped and ends in three sharp points. It weighs not more than 27⅛ ounces, and is 43¼ inches or less in length. It always meets the opponent's sword edge to edge.

The épée, or duelling sword, is primarily a thrust weapon, and offense may be made only with the point, although for defense, the blade and guard are used. A fencer is vulnerable to the épée anywhere on his body. In medieval days, when rapiers flashed to settle points of honor, a single touch drew blood, satisfied honor, and ended the duel. Today one touch with the épée, the rapier's close descendant, terminates the bout.

Modern "duels" are fast and furious. A fencing bout is like an argument, with thrust met by reply and followed by counter-argument, until finally a telling blow is scored. Unfailing courtesy and the highest code of sportsmanship are the rule. Fighting an uphill game cleanly is the goal. Courage, audacity, and chivalry always have been the watchwords of this royal sport.

[*Continued on page* 134]

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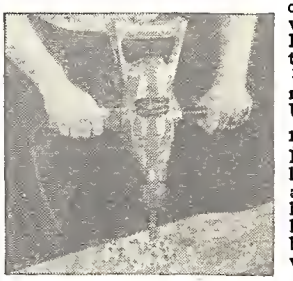

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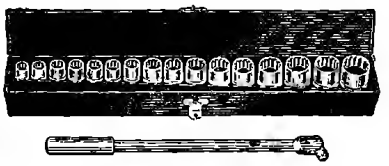

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D'Artagnan Comes Back

[*Continued from page* 133]

The movies, based on romantic themes of the days of chivalry, have contributed a great deal to the popularization of fencing in the minds of Young America. And in order to demonstrate the fine points in the art, the cinema stars themselves must be adept at the sword.

From the backyard *salles d'armes*, where a host of new converts are mastering the art of d'Artagnan, may come future champions who will dazzle Europe with their feats of swordsmanship. For now we are being taken seriously by European fencers, who learn in childhood to use the foils as naturally as Yankee youngsters wield a baseball bat.

Famous European masters have flocked to the United States and the exploits of their pupils have drawn nation-wide attention. Among them is Aldo Naldi of New York, Italian Olympic fencing champion and undefeated world champion. Under the tutelage of Uttenhove teams from the Los Angeles Athletic Club have swept everything before them, winning the team championships in all three weapons—épée, saber, and foils—for the past five years. Among his proteges are the "Four Musketeers," a dashing quartet composed of Ed Carfagno, Pacific coast foils champion; Andrew Boyd, twice outdoor épée champion of Southern California; Fred Linkmeyer, who four times has won the Pacific Coast duelling sword championship; and Ralph Faulkner, a member of the 1928 and 1932 Olympic teams and six times winner of the Pacific Coast saber championship.

Such centers as New York's Fencers' Club, the Salle d'Armes Vince, and headquarters maintained by George Santelli, Olympic coach, are training sword artists of the highest calibre. They are such men as stocky Hugh V. Alessandroni, dextrous left-handed fencer who holds the national foils championship; tall, rangy Norman C. Armitage, recent captor of the sabre crown for the third successive year; Lieutenant Gustave H. Heiss, out of competition in 1935 but recently recaptor of the épée title he held in 1933 and 1934; and John R. Huffman, national three-weapon champion, an all-around fencer of great ability.

Rated in order below Alessandroni are Joseph L. Levis, John R. Huffman, Dernell Every and Frank S. Righeimer, Jr. The top four behind Lieutenant Heiss are Miguel A. de Capriles, Lieutenant F. A. Weber, Andrew Boyd and Jose R. de Capriles. Following Armitage are Huffman, Peter W. Bruder, Miguel de Capriles and Nickolas Murray.

Mrs. de Tuscan, Marion Lloyd, Dorothy Locke, Carol Alessandroni and Muriel Guggolz are rated tops in the women's field, which includes also Madeline Dalton, 1935 women's national intercollegiate fencing champion and recent winner of the Santelli Trophy, Barbara Cochrane, Mrs. Dolly Funke, and Dorothy Grimmelman of New York University.

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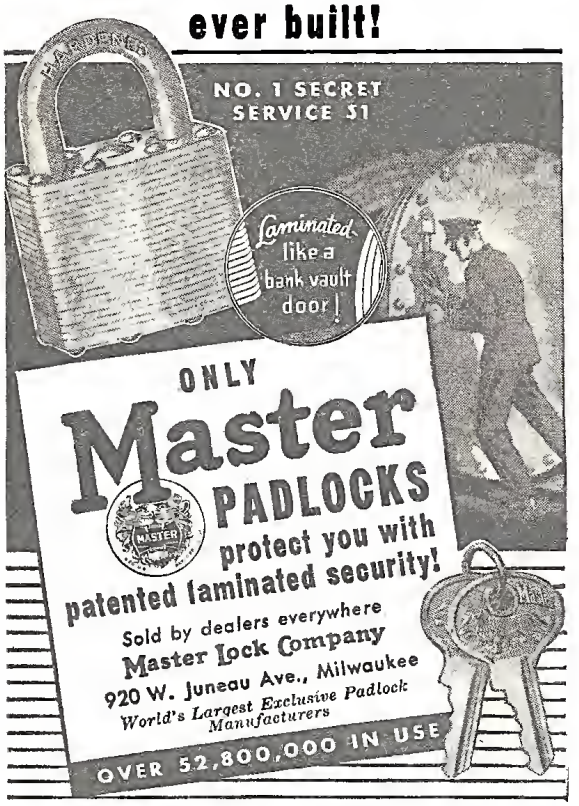

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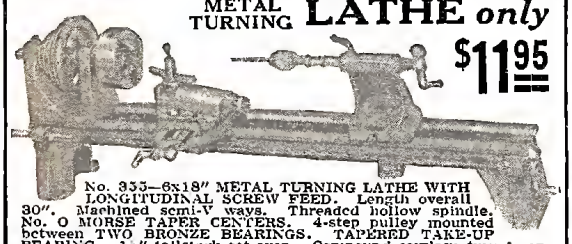

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Skiing For Beginners

[*Continued from page* 130]

wood is either kiln-dried or dried in sheds by a slow seasoning process. The method of drying in sheds, with the boards piled one on top of the other with sticks in between for free circulation of air, is the best. This process, however, is not general as it takes two years. Kiln drying is the fast method, but it tends to break up the wood fibers, taking the spring and life out of the board.

For use in rolling hills and valleys, where the snow does not lie too deep, a ski 2½ inches wide at the center is recommended. Where there is deeper snow, as in the north woods, a 3-inch width will afford a better bearing surface, with less possibility of sinking. Where a ski is used in hills and mountains an even wider one is recommended. The mountain or hill ski should also be 4 or more inches less in length than the ordinary cross-country ski. Length of a ski is judged by raising the ski upright on the floor and reaching your arm overhead. The ski should reach the center of your opened palm.

The groove extending down the center of the running surface of the ski is not, as some people think, an ornamental touch. It has a distinct purpose, helping the ski to hold better to the snow, especially on side hills where, without a groove, the ski would slide sideways.

At first most skiing was done with the feet strapped to the skis. This arrangement is still desirable for the ordinary purpose and has its advantages in the fact that the foot can be disengaged from the strap in case of a spill, whereas if the foot is locked to the ski, as in the case of the new metal toe and heel clasps, not only is the ski in danger of snapping, but the foot may be harmed as well. But if you have attained anything approximating a knowledge of how to manage these waxed runners, the metal plates are a good suggestion. Such bindings give a greater feeling of security.

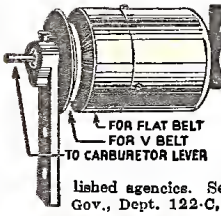
A roomy, box-toed boot is best for skiing. A shoe of the sort should take about two pairs of heavy wool socks and a pair of silk socks for warmth next to the foot. The boot leather should be stiff enough so that the ski binding will not press it down when tightened, causing chafing. Ordinary shoes are often used, but these are next to useless.

Methods of Skiing

The amazing runs made by skiers, particularly in the mountains of the West, as often depicted upon the screen, cause one to marvel at the possibilities of this sport.

These graceful slides at mile-a-minute speed are accomplished through body rhythm, skillful balancing, a sway from right to left, and much of a crouch. This is the first thing to learn about skiing. After that the rest is easy. The fault with most beginners is that they choose to go about the

[*Continued on page* 139]



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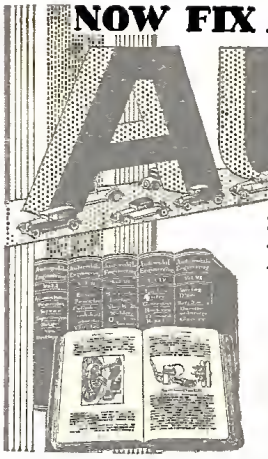

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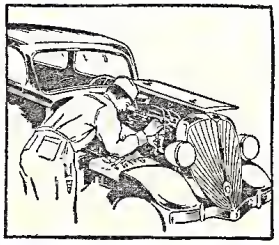

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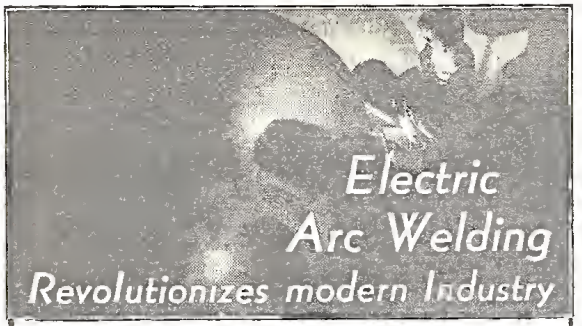

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Skiing For Beginners

[*Continued from page* 136]

business of taking a slide standing erect, with little body movement. The result is they are soon off balance, and there is a spill. That a few of these spills is sufficient to turn some against skiing is little wonder. The skier must learn to crouch while taking a hill and to attune the body to making the turns.

By far the most useful skiing trick while taking a hill is the Christiania turn, a weaving downward in a snake-like, S-shaped track. This is the best means of slowing up. The amateur in negotiating a hill inevitably attempts to go straight down. This may be all right on small hills, but where long and successive grades are to be taken it is necessary to brake the momentum, or the speed will be beyond mastery and possibly dangerous.

In order to execute the Christiania turn, you start down the hill, fairly erect at first, then crouch. You make the first turn to the right. When making the turn the body straightens up and leans to the *right,* turning the skis. At the same time the left shoulder and arm are swung to the right. Thus body weight and skis make the turn in conjunction. Soon a turn to the left is made, whereby the process is reversed. An idea of how this necessary motion is made can be had if you sit in a chair and imagine you have a steering wheel three feet in diameter in front of you; turn first to the left and then to the right, rotating your body at the hips and projecting your right arm and shoulder to the left, and then your left arm and shoulder to the right.

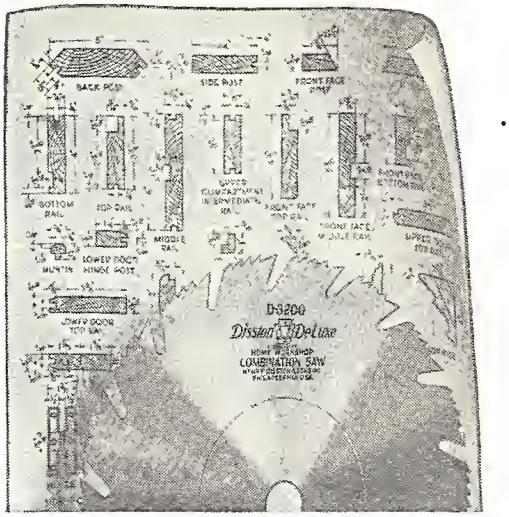
The Telemark Turn

In making the Telemark swing, the outside ski invariably guides and directs the turn. For example, in making the left turn, the *right* ski advances so that the right ankle is opposite the left ski bend. The Telemark turn differs from any other in that the heel of the left foot is lifted from the flat on-ski position in making the swing. As the left heel is raised, both knees are bent, the left more than the right.

Now as the swing is made, the full weight of the body bears down on the right ski, and its inside edge turned down, aided by an inward twist of the right knee and an outward pressure of the heel. At the same time, as the outward pressure of the heel is emphasized there is an inward toe pressure. The chief pressure goes into the outside, in this case the right ski.

In making the turn hold the arms fairly close to the body, holding the ski poles in front and letting the points trail. When the turn is going into completion, lift the arms, holding the poles out to the side. The poles greatly aid the balance, and to know how to handle them successfully is to master the turn much quicker. Every move in this tricky turn must be studied carefully before it is properly achieved. The Telemark is useful

[*Continued on page* 141]



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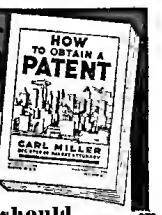

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Skiing For Beginners

[*Continued from page* 139]

on small hills and should be well understood before the Christiania is attempted.

The Christiania Swing

Where the Telemark is used for making comparatively simple turns on ordinary hills, the Christiania is meant for steep hillsides where one is sliding at considerable speed. Again the left turn is taken as an example. Where, in the Telemark, the outside ski is advanced and edged for pressure for cutting through to make the turn, in the Christiania, the inside, or *left* ski, is advanced about a foot ahead of the right. The inside ski is turned inward to a tilt position, the edge cutting into the snow, guiding the turn. The weight is thrown on the left ski, but as soon as it begins to turn, the pressure must be eased and the body weight exerted on the right ski, which is banked or pressed downhill to stay the turn.

By using the Christiania turn it is possible to tackle the steepest grades. Such skiing calls for ceaseless practice and a thorough mastery of the few certain, necessary moves. The skier must understand these moves and thoroughly learn the matter of balance, swing and movement. He must be able to observe at a glimpse what lies ahead of him and know what to do the instant the lay of the slope below is visualized.

The Double Stem

This is another method of braking speed on a downhill course. The beginner will do best with this on a gentle incline and on fairly hard snow. To accomplish the Double Stem, turn the points of the skis in, as in a V, being sure the points do not touch. The inside edges of the skis cut down in the snow, the knees assuming a turned-in position, the body braced and balanced to prevent a spill. The body on this maneuver is bent forward from the waist.

Side Step and Herringbone

It is one thing to glide down a hill and quite another to get back up again. One way is to go up the slope at an angle, then making a kick-turn by lifting the skis and zig-zagging up.

The side-step is simply accomplished by going up a hill sidewise, lifting the inside ski, and digging its edge into the snow, then pulling the other ski up and digging that in for a firm hold while the inner ski is lifted for another dig. The side-step also can be used for going down a hill too steep to attempt to ski.

The Herringbone is probably the most efficient and quickest method of climbing. The skis are worn toes out. One ski is lifted so that the heel is carried over the heel of the other. As the ski is lifted forward at its angle it is stamped down sharply in the snow, inside edge tilted, and the other foot is carried up, and so on. Ski poles are a great help. While the Herringbone ascent is a strain on the leg muscles and most tiring, nevertheless, it is the best way to make the grade.

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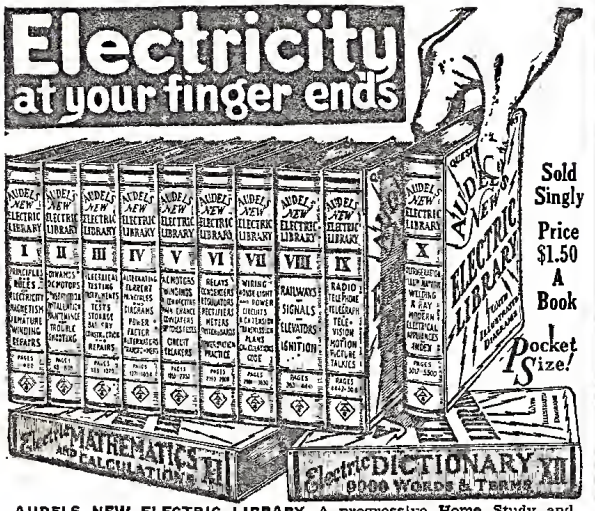

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Gas Masks For All

[*Continued from page 45*]

gas burns was no more unpleasant than the acquiring of a severe case of sunburn at the beach—in neither case does one realize what he is letting himself in for until it is too late to do anything about it. Aside from the fact that my eyes and throat were also burned, bringing on temporary blindness and loss of speech, my suffering was not as great from the gas as it has been from severe sunburn, although the gas burns were harder to heal. Two months after the attack, however, there were no after effects. The wound, on the other hand, although classed as slight, caused intense suffering, took longer to heal, and bothered me for years.

Mustard gas and Lewisite are the persistent vesicant gases. Both the vapor and liquid produces burns. Unless splashed by the liquid itself, these burns are seldom severe enough to cause death in a healthy person. Since Lewisite also produces arsenic poisoning in the burns, it has a higher fatality rate than mustard; but it is not considered to be of as great military value, since it is less persistent than mustard. A rain, or the mere flushing of the contaminated area with water, will destroy Lewisite, while mustard continues to give off casualty producing vapors for days—sometimes weeks in cold weather.

Chlorine and phosgene, the common non-persistent asphyxiating gases, produce coughing, irritation of the eyes, pains in the chest, and difficulty in breathing. Long exposure to a strong concentration will cause death by asphyxiation. A good gas mask furnishes complete protection.

Some gases are not really gases at all, but finely divided solids — invisible and odorless smokes—the sneeze gases. The immediate symptoms of these gases are the most unpleasant of all. They cause violent irritation of the nose and throat, spasms of sneezing, pains in the head, teeth and gums, and intense mental depression. Removed to pure air and kept quiet for half an hour, the victim recovers completely. There are no after effects. Tear gas, used by police to control riots, causes an intense smarting of the eyes, a symptom that disappears after a few minutes in clear air.

The World War proved, and subsequent experiments have failed to disprove, that mustard gas is still the most effective casualty producing chemical known. With extreme low volatility, it evaporates slowly. It may remain in contaminated ground, or splashed on buildings, for days, slowly giving off a vapor with the not unpleasant smell of mustard. It may be sprayed as a liquid from airplanes, settling over everything, and making decontamination a gigantic task.

A military gas, to be at all practical, must be heavier than air, so that a casualty-producing concentration can be held on the ground. It must be stable, so it can be transported without danger of exploding. It must not corrode a container of cheap metal.

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Please attach a letter stating age, occupation, employer's name and address and that of at least one business man as reference.

INVENTORS *SEE* Pages 6 and 7

Final Prizes Awarded In Inventions Contest

Would you like to be able to glance over the radio program in your morning newspaper, select your favorite broadcasts for each half-hour of the day, and adjust your radio receiver so that it would automatically tune in each broadcast as the day advances? A suggestion for a radio receiver that would make this possible won first prize of $25 cash in the final Needed Inventions Contest for Mrs. Edna B. Daniels, of Sauk Center, Minn. The contest is now concluded.

We are aware that several radio companies are developing a receiver of this type, but they are not readily and economically available to the public at this time.

Getting out of an auto would be much easier for the driver if a suggestion made by F. Doughty, of Yorkshire, England, was carried out. Doughty won second prize of $10 cash for suggesting a swivel mounted driver's seat. A strong spring would return the seat to normal position.

Readers who have experienced the difficulty of placing a letter in a public mail box while holding an opened umbrella or bundles with one hand and trying to open the mail box and insert a letter at the same time with the other would appreciate mail boxes that could be opened by a foot lever. Fred Lettino, of Astoria, N. Y., made the suggestion and it won third prize of $5 cash.

A prize of $2 cash was sent to Max Kowalsky, of New York City, for suggesting a self-reinking typewriter ribbon device, and to George Tarzian, of Chicago, Ill., for his suggestion of a built-in dust and dirt receptacle for modern kitchens which would eliminate the common type of dust pan. A timely suggestion for a detachable anti-skid device that could be worn on shoes to lessen danger of slipping on icy stairways won a $2 prize for Wilfred Dobbert, of Inkster, Mich.

Prizes of $1 each were awarded to: Samuel Rabin, of Brooklyn, N. Y.; Frank R. Waters, of Terre Haute, Ind.; Clyde V. Smith, of Peoria, Ill., and F. W. Covill, of East Weymouth, Mass. Gillette razors have been sent to several others as prizes.

Marsh Buggy

[*Continued from page* 40]

accomplished on land in orthodox automobile fashion and while this same steering system will partially function in water travel, individual brakes on all four wheels permit better marine control.

The design and fabrication of the wheels was made possible by the Goodyear Tire and Rubber Company and the alloys in the frame were the production of the Aluminum Corporation of America. Power has been supplied admirably by the Ford V-8 engine.

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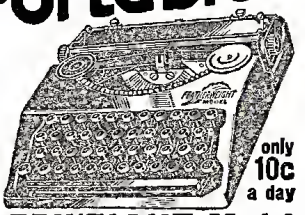

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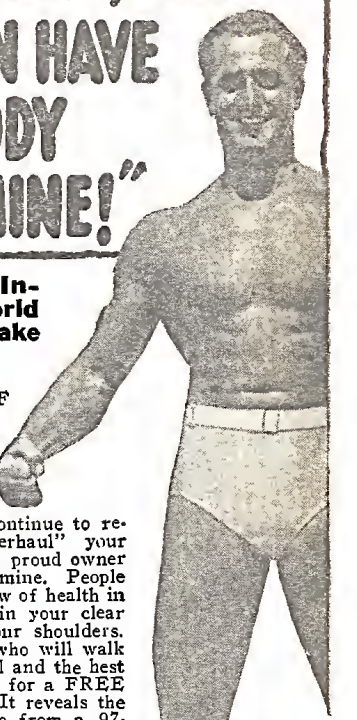

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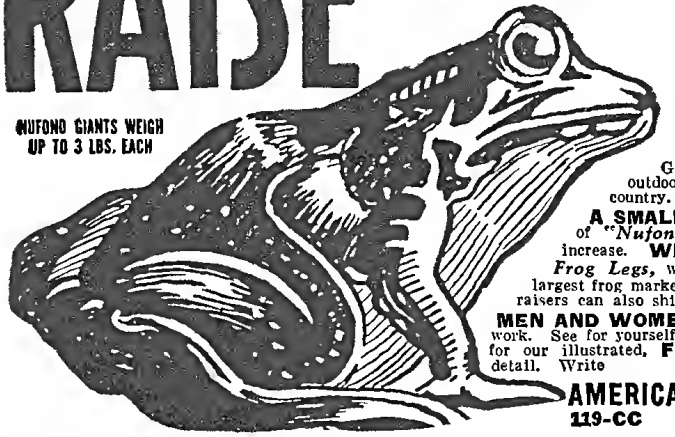

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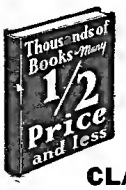

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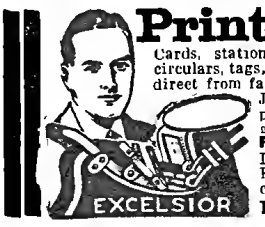

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The Camera Queen

[*Continued from page* 128]

and gay-colored men's shirts for many of her jobs, laughed when I asked her whether she ever took any chances with her life to get some of her photographs.

"Chances?" she repeated. "Not since the companies that insure me began to bother me every time they heard I was doing something they were afraid might make me a bad risk. I'm always very careful what I do and where I go. Of course, I have perched on a steel girder to get a photograph of a skyscraper and I've hung out of windows for other shots, but it never bothered me at all. I just don't get dizzy, and besides I'm too careful!"

Once, when she was photographing the America's Cup races at Newport, she slipped from the deck of a speedboat and landed—camera and all—in the cold waters of Narragansett Bay. And on another occasion, a few weeks before my interview, she was nearly shot by an army sentry when she went to Bedloe's Island to get some night pictures of the Statue of Liberty.

One of her prize possessions is a photograph she made of President Roosevelt at his desk in the White House and which he autographed for her.

"I had no difficulty at all getting the President's permission for the picture," she recalled, "but it was another matter in the case of Mrs. Roosevelt. I never got to see her at all—her secretary saw to that very efficiently."

She is called on to do a large amount of portrait work and has taken the pictures of most of the leading industrialists of the country. While in Russia she photographed Stalin's mother and great aunt. She also has done Dr. Hans Luther, Senator Borah, Secretary of State Hull, Secretary of Labor Perkins, Katharine Cornell, O. O. McIntyre, Damon Runyan and a host of others. One of her most important jobs was the photo-mural in the 160-foot rotunda of the R. C. A. Building in Rockefeller Center. Measuring ten and one-half feet in height, it is one of the largest photo-murals extant, and the only one ever done by a woman.

Last fall she toured the Northwest, snapping pictures for Life, for which she now works. She mingled with roustabouts on the world's biggest earthen dam at Fort Peck, Montana. Expecting to snap purely construction pictures, Miss Bourke-White discovered that the workers and their families had refused to live in the meticulous quarters provided by Army engineers, and had established six towns of their own which resembled those of the frontier days of '49.

Despite her almost twenty-four-hour schedule of work she finds occasional time to indulge in her three hobbies: swimming, skiing and dancing. She confessed she would rather "dance the tango than eat" and revealed she had an arrangement with a New York dancing school whereby she does occasional photographs for it in exchange for the chance to dance and learn the latest steps.

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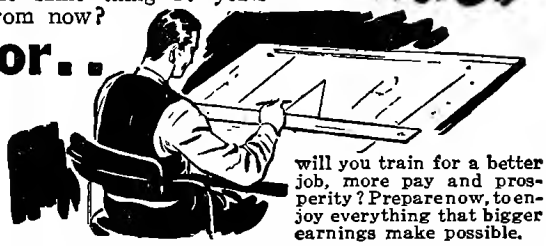

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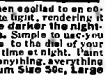

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A powerful high grade Air Pistol shaped like an automatic, gets the best sights. Power B-B shot obtainable anywhere. Very powerful yet perfectly safe for boys to handle. Two styles, Single Shot Pistol or Repeater. Can Regulate Range from 100 shots in one loading. The Single Shot shoots Air Rifle Darts and B-B Shot. Well made and durable: all metal parts nickel plated; natural wood stock and forend. Front and rear sights. Better than an air gun. Shipped by express. Not prepaid.
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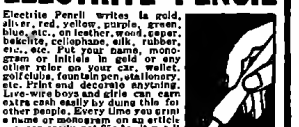

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Six Power
25c

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The American Flyer Typewriter is patterned after standard machines. Writing always visible on these machines. Capitals and small letters, punctuation marks, etc. Writes 68 characters. Standard typewriter ribbon, self aligning paper feed, and sliding carriage. Accommodates full size sheet of letter paper up to 8½ inches wide, any length. Prints neat and attractive writing. You soon familiarize yourself with the arrangement of the keys so that after a short time you naturally acquire speed. Standard characters are used. Heavy gauge steel, electrically welded and nickeled. Finished in lustrous black and colored enamel. Size 8 x 7½ x 11 in. Price $2.50.

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PRICE **25c**

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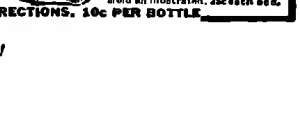

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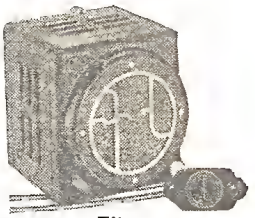

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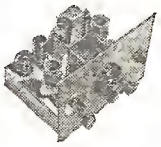

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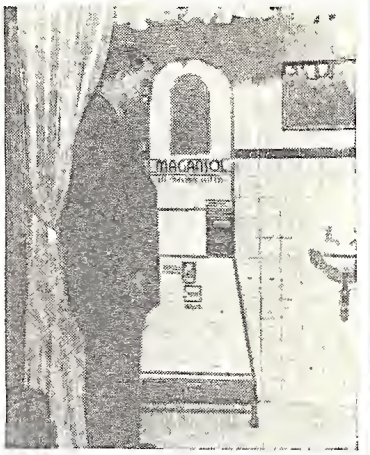

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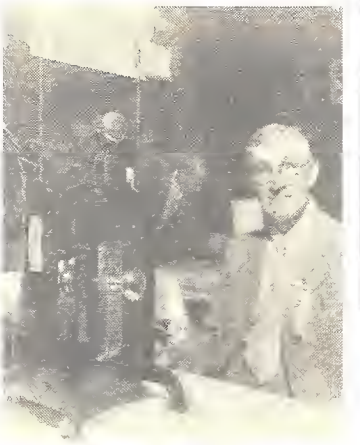

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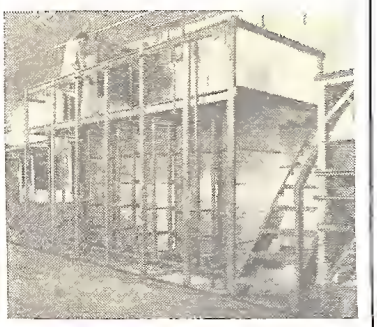

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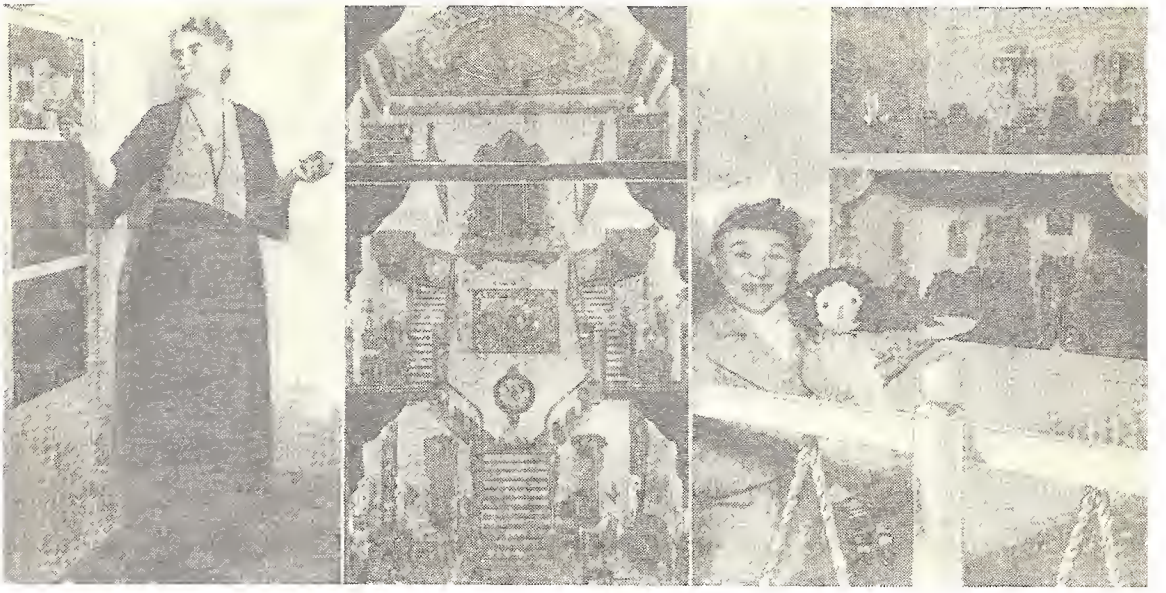

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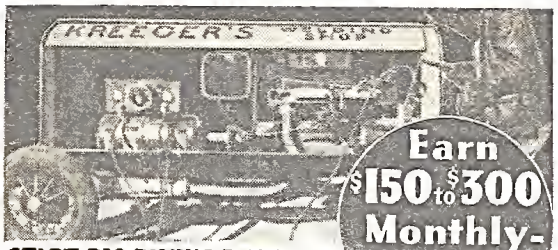

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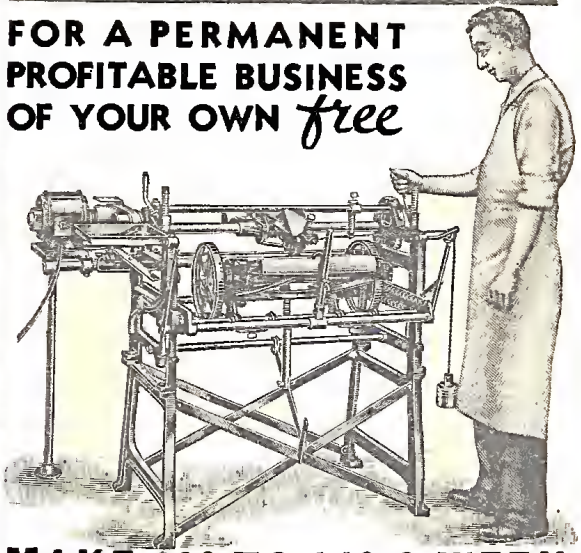

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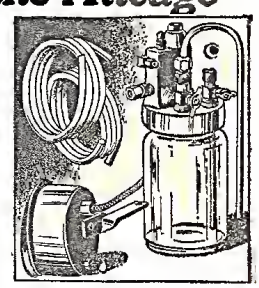

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Pulling The Ripcord

[*Continued from page* 53]

see the Irvin factory. And when Ann Morrow Lindbergh accompanied her husband "north to the Orient" she wore a special parachute with gold mountings, the personal gift of Mr. Irvin, while Prince of Wales, former King Edward VIII wore an Irvin parachute on virtually all of his flights.

Along an entire wall of the Buffalo plant are names of members of the Caterpillar club, that famous organization composed of men and women who have saved their lives by floating to earth wearing Irvin Airchutes after being forced to leave their planes in mid-air. Each member of the club gets a diamond stick pin, emblem of belonging to the world's most exclusive organization of its type.

From the beginning Irvin turned his inventive mind to improvement of his parachute. Thus came the tiny pilot chute which speeds the opening of the larger main chute of silk. The latest improvement, as yet not marketed to any great extent, is a safety catch invented by Irvin.

Frequently persons who had descended in chutes were dragged along the ground after landing. Often injuries resulted from this fact, especially when high winds were blowing, so Irvin invented a safety clasp which, given a quarter turn, releases the parachute from the wearer after he has landed and prevents his being dragged.

The familiar back-chute pack is being succeeded by a seat-pack. The air traveler sits in a comfortable chair, the cushion of which becomes a parachute in time of trouble. It takes only three seconds to adjust the straps and the passenger dives overboard in his seat cushion, pulls the rip cord, and floats safely to earth.

Irvin believes this is the great future opportunity for his company. He sees the time near at hand when redesign of all air transports will be forced. In his opinion these planes should be so constructed that in time of trouble the side or bottom of the airliner would drop out and the passengers would ride safely down to earth with their seat-pack chutes.

From the time the parachute silk enters any of the nine Irvin plants scattered throughout the world, until it is packed for final use, inspection is rigid to the extreme. The silk is tested and sewed by machine, some parts by hand, and inspected as every process is completed. The packing is supervised with extreme care, for the company is jealous of its claim that no Irvin chute, properly packed, ever failed to open if the wearer pulled the rip cord and was far enough from the earth for the wind to catch and billow the silk.

Irvin flies throughout Europe contacting governmental heads who are in the market for parachutes. One day he is at his British factory, the next in Russia, and the third on the way to Buffalo for a brief visit.

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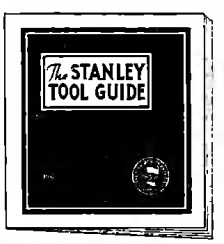

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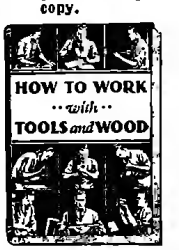

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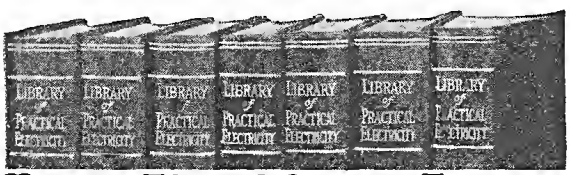

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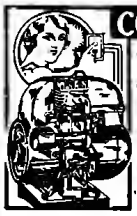

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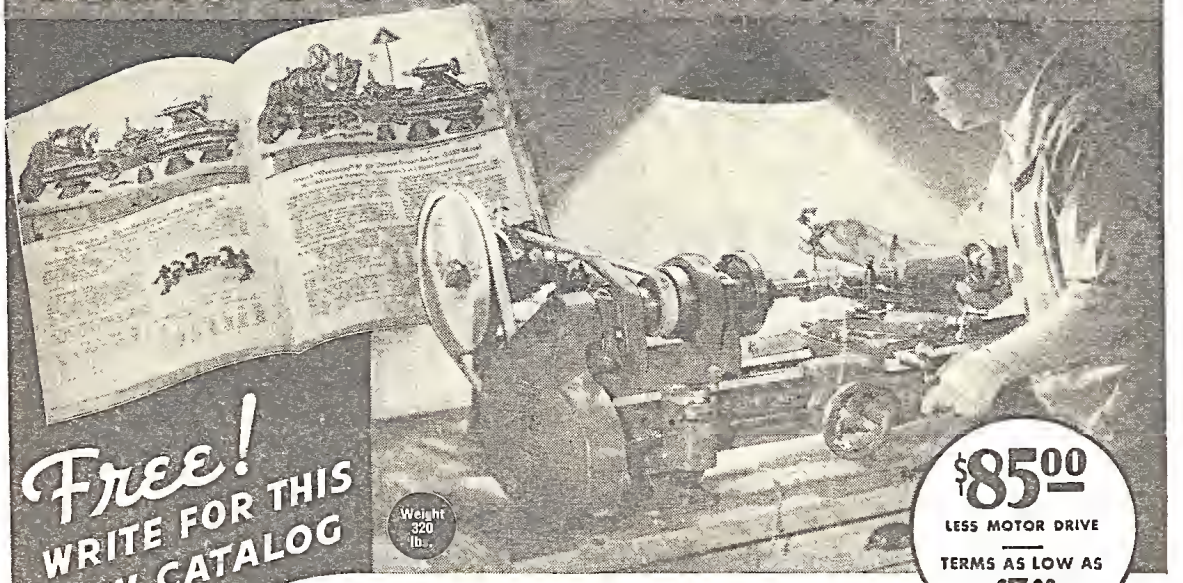

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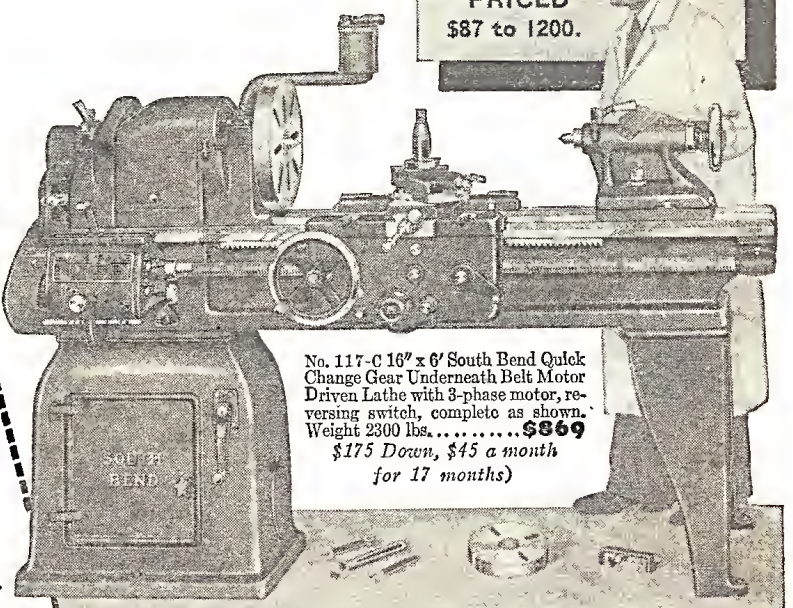

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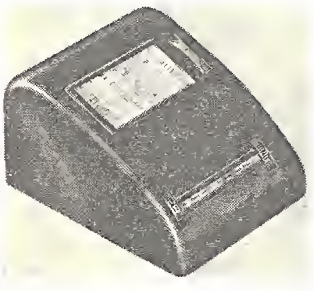
A new type lock designed to give protection against picking provides a registered key system as a safeguard against unauthorized key duplications.

An improved respirator for use in dust laden workshops or mines assures a larger filter area for easier breathing and greater comfort to the wearer because of light weight and unobstructed vision.

A high mast lift truck designed for the handling of heavy paper rolls picks up a roll and deposits it at the desired point without the driver leaving the seat or requiring aid of men on the floor.



Radio fans will appreciate this device which logs call-letters of over 1600 long and short wave stations on a 140-inch revolving tape.

An oil radiation computing device that enables engineers to quickly estimate the amount of pipe needed for heating a building without using a measuring tape or less reliable foot pacing method.

An oil burner ignition interference suppressor that effectively reduces radio interference caused by the electric motor of an oil burner.

Top—Flat coils of this electric cooker are said to heat more efficiently on usual amount of power. Lower—Cross section of coils.

A unique pronged metal insert that firmly grips both the rung and wall of the socket of loose chair rungs to hold them tight indefinitely.

Duplicate replacement coils for electric heating appliances that insure snug fit and proper wattage.

An automobile radio that features an adjustable position outside aerial.

An automatic taping machine for taping edges of important documents to prevent them from tearing or mutilation.

A detachable metal covering for shoes protects workers from danger of crushed toes through falling of boxes and other heavy, bulky objects.

A precision instrument for the production testing, grouping and adjusting of coils and condensers at radio frequencies permitting greater accuracy.

A crystal clear plastic possessing brilliant phosphorescent qualities.

A mechanical device that stops carbon knock and spark plug fouling when inserted between each plug and cylinder head of an automobile engine.

Radio static caused by electric razors can be eliminated by use of compact filter device shown here.

Editor's Note—Addresses of manufacturers of these and other new products in this issue can be obtained by sending a stamped, self-addressed envelope to Modern Mechanix Publishing Co., Information Bureau, Fawcett Building, Greenwich, Connecticut. Manufacturers are invited to submit material for publication on this page.

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PULLING the RIPCORD

by P. D. Fahnestock

Col. Lindbergh, as well as many other famous pilots, owes his life to Leslie Irvin, for his parachutes have saved the noted flier on four emergency occasions.

Above—Parachutes have changed war tactics. In Russia, army maneuvers include mass jumping by hundreds of soldiers who practice landing behind the "enemy" lines where they can attack and harass the foe from the rear.

WITH an ambulance in readiness and the air tense with excitement, a 22-year-old daredevil named Leslie Irvin soared above McCook Field at Dayton, Ohio, on April 28, 1919, to make the first live parachute jump. Balloonists and German war airmen had used static parachutes but the new cord-released device devised by Irvin and Floyd Smith, who flew him on this memorable flight, was an unknown quantity.

As the De Havilland plane reached 1,500 feet, Irvin clambered out of the rear cockpit with a second parachute strapped to his chest should the one at his back fail. Army officers below held their breath as Irvin fell backward from the ship head first. Almost instantly the parachute opened. So delighted was Irvin at this that he paid little attention to his descent and broke an ankle in landing.

This morning exploit 18 years ago proved deeply significant. Because of it, Soviet Russia's war plans include the landing behind defenses of fully equipped soldiers from the clouds! Because of it, 805 pilots have survived mishaps to become members of the Caterpillar Club. Finally, as a result of his adventure, Irvin today is parachute maker for the entire world.

Leslie Irvin was in his middle teens when he made up his mind to see life as an adventurer. To the horror of his parents, who then resided in California, he decided to become a stunt man for the motion picture industry, then in its infancy.

For several years he followed that hazardous occupation. He did the "slide for life" clinging by his teeth to a leather mouthpiece as he slid down to earth from dizzy heights. He rode a motorcycle in the "globe of death." But best of all he loved to make balloon flights and parachute drops. (So skillful was he at this neck-risking pastime that the French government commissioned him a balloon pilot when he was but 16 years of age.)

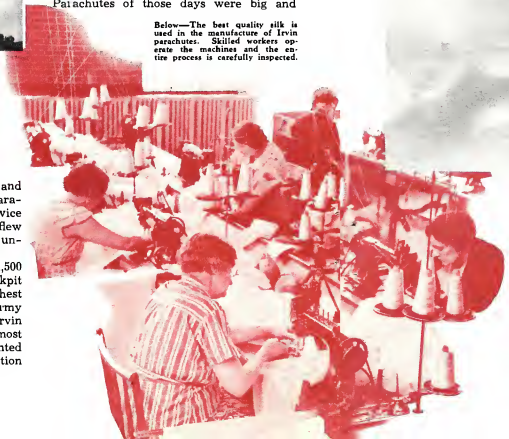
Parachutes of those days were big and clumsy. They were attached to the sides or bottoms of the balloons. Sometimes they were torn off as the balloon left the ground. Sometimes they didn't open or couldn't be detached. Young Irvin thought they were pretty crude and gave serious thought as to how they could be improved.

Houdini had shown him such parlor tricks as concealing large silk flags and handkerchiefs in tiny spaces. This gave the young man an idea. Why not make a parachute out of silk and fold it up so that it could be worn in a small pack? He set about to make his first parachute and soon had it ready for trial.

In an effort to demonstrate his device Irvin had gone to Buffalo where the Curtiss company had been making airplanes in great quantities for the Allies. From Buffalo, he had been directed to Dayton where Major E. L. Hoffman of the Air Service, Floyd Smith and others had been experimenting with safety devices.

"Your device is all right but we have no money for such things, there is nothing in the budget for parachutes," a junior officer who had arranged the demonstration declared.

Parachute jumping is part of the training of U. S. Navy and Army aviators. Above—A Naval flier making a head first plunge from a DH training plane. The jumper waits until he is fully clear of the plane before pulling the ripcord to release parachute.



Below—The best quality silk is used in the manufacture of Irvin parachutes. Skilled workers operate the machines and the entire process is carefully inspected.

Leslie Irvin, designer of the Irvin Air Chute. Mr. Irvin's boyhood fascination for parachute jumping led him to manufacturing and perfecting a parachute that is now used throughout the world. Many pilots will wear no other type.

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